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FEBRUARY

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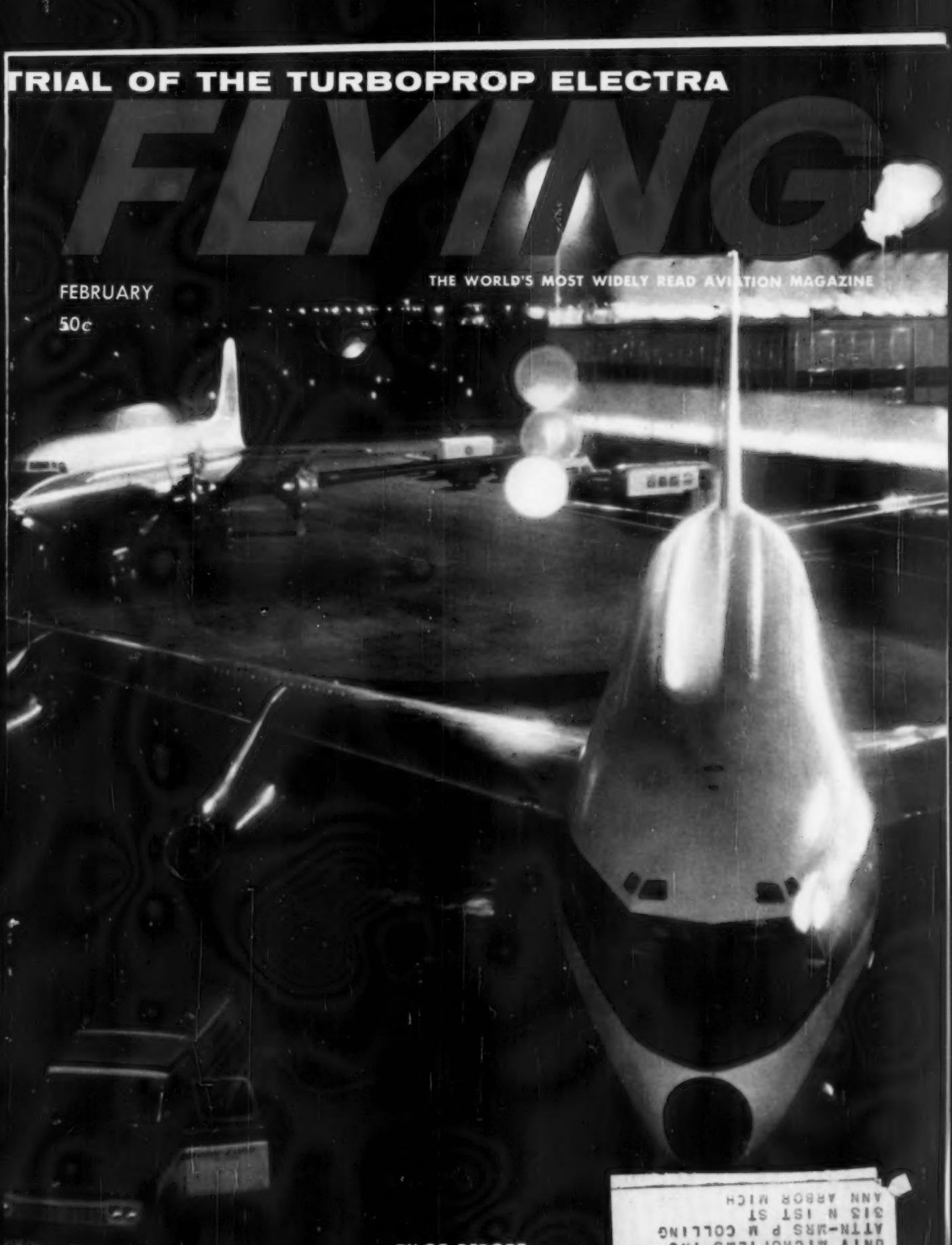

PILOT REPORT

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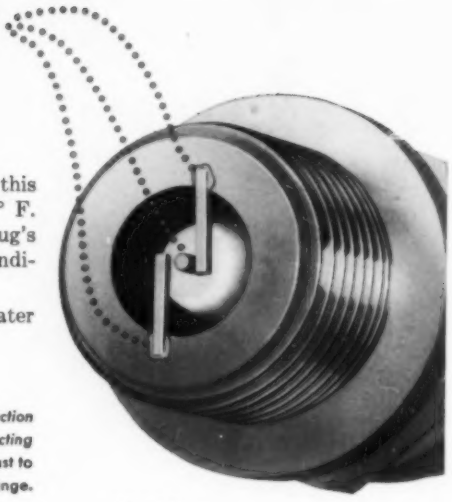

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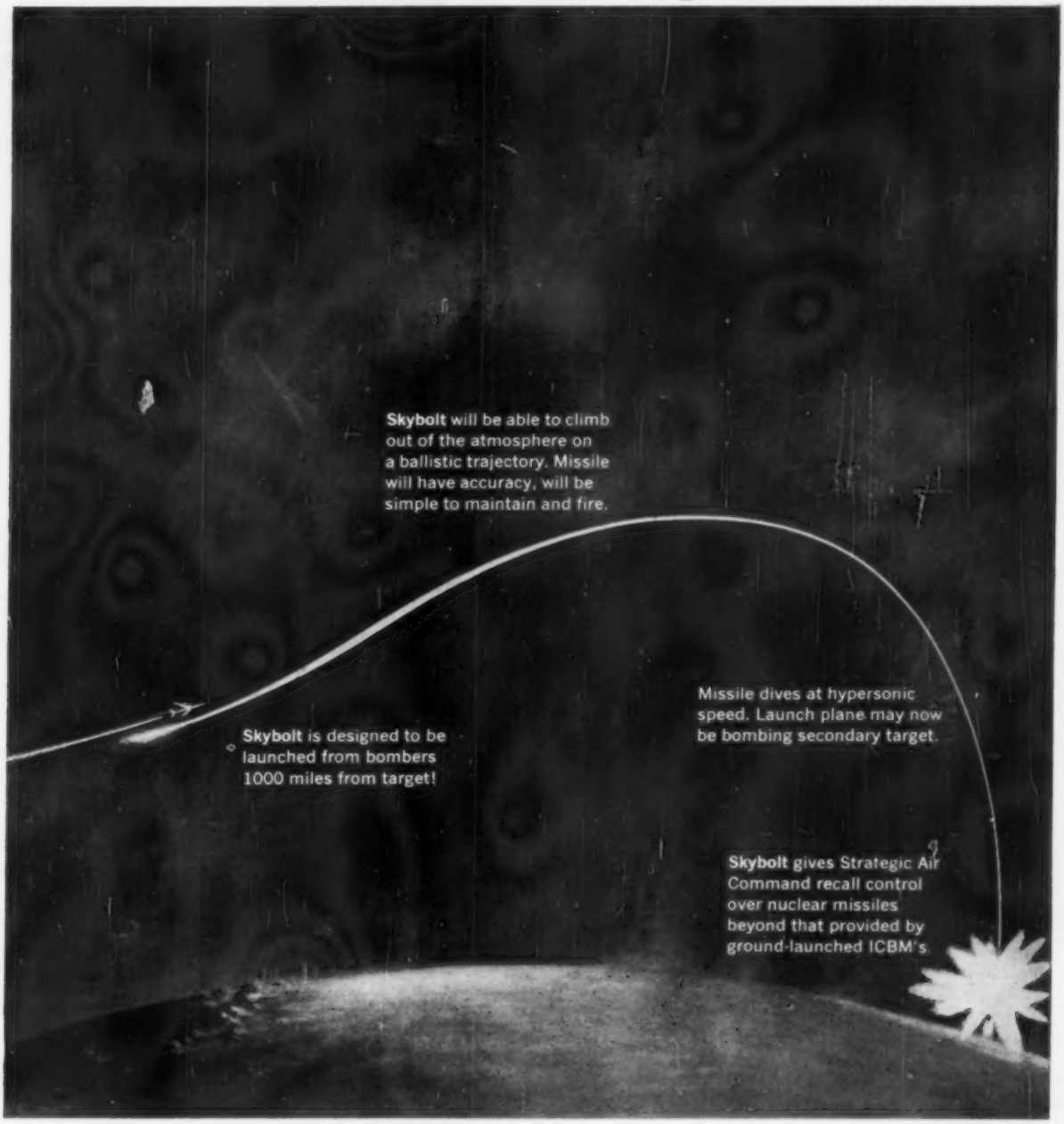
ACs . . . ON MORE NEW PRIVATE PLANES THAN ANY OTHER BRAND

One of a series of advertisements in the public interest to show how Douglas works with all our military services and space agencies.


Skybolt will be able to climb out of the atmosphere on a ballistic trajectory. Missile will have accuracy, will be simple to maintain and fire.
Skybolt is designed to be launched from bombers 1000 miles from target!
Missile dives at hypersonic speed. Launch plane may now be bombing secondary target.
Skybolt gives Strategic Air Command recall control over nuclear missiles beyond that provided by ground-launched ICBM's.

New Air Force Douglas Skybolt will extend role of manned aircraft in Space Age defense

Now under development, this new air-to-ground missile of nuclear capability could add years of usefulness to U.S. Air Force B-52s and the Royal Air Force Vulcan bombers. Four Skybolts can be launched from one B-52 at widely divergent targets. And since the missiles will be released as much as 1000 miles from target, the bombers carrying them will be practically invulnerable to attack.

DOUGLAS

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FEBRUARY, 1961
VOLUME 68, NUMBER 2

COVER: Pan Am's Boeing Intercontinental 707-321 at New York's International Airport. The aircraft is powered by four P&W JT4 engines of 17,500 pounds thrust each, carries 167 passengers, has a range of 5,000 miles, a cruising speed of 575 mph and operational ceiling up to 40,000 feet. Photo by John Ross.

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IN THIS ISSUE of FLYING there are pilot reports covering VTOL, STOL and conventional-type aircraft. In one feature two prototypes are involved, each fitted with a different powerplant. Both were flown—though almost a continent apart—again indicating an aggressive effort to develop editorial matter keyed to reader interest.

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WINGS and THINGS

NAVION AIRCRAFT planning a six-place version of its Rangemaster. The new Super Rangemaster would be fitted with a 340-hp supercharged engine which would turn a Hartzell three-bladed propeller. Cruise speed would run about 235 mph; service ceiling 35,000 feet. Company's five-place Rangemaster, rolling off the production line this month, will be priced about $25,000 with full instrumentation including omni and Motorola ADF.

NEW AIRCRAFT: *Lockheed's Marietta, Ga., division developing small, military VTOL cargo aircraft to enter in all-service competition. Republic may market six-place turbine helicopter; design is entered in Army's light observation helicopter competition; prototype may be built.*

LOCKHEED JETSTAR is now going to the Navy, which to date has ordered two of the sleek, 600-mph-plus four-jet aircraft for 1961 delivery. Air Force, which had five on order, will take about six more C-140s for 1962 delivery. Commercial orders total 23. Pratt & Whitney JT-12 powerplants, of 3,000-lb. thrust each, expected to increase rating to 3,300 lb. by the end of 1961, which could add to aircraft's gross weight.

U. S. ARMY *has had its pilots in Europe flying the Italian Fiat G.91, the NATO lightweight (11,350 lb. gross weight) reconnaissance and fighter aircraft in Mach 1 speed category. Move points up Army's interest in tactical aircraft geared to close troop support and rough-field operation. G.91 is on order by Italians, Turks, Greeks and Germans. Powerplant is Orpheus 803 of 5,000-lb. thrust.*

DASSAULT COMMUNAUTÉ MD-415, French turboprop executive transport powered by two Turbomeca Bastan of 750 shp each, will be produced both by Dassault and Sud Aviation, provided 50 firm orders are placed. American business pilots are being invited to France for evaluation flights in hopes of stimulating U. S. orders. Continental Aviation is licensee on the Bastan powerplant.

BOEING 720B, *a combination of airframe modification and Pratt & Whitney JT3D turbofan of 17,000-lb. thrust, has shown an impressive 22 per cent increase in miles-per-pound-of-fuel over the initial 720 powerplant-airframe configuration. Gain is substantially in excess of predictions. Advanced configurations of the JT3D engine are running up to 23,000-lb. thrust at the P&W plant.*

CESSNA 185 has been fitted with EDO floats and tested at Grand Lake, Mo. Certification is expected this month, following which the new airplane will be fitted with Federal skis. Floats are an improved version—from a drag standpoint—of the 180 installation.

MITCHEL AFB, N. Y., *the famous Long Island field (see Flying for Dec., page 54), may be closed June 30, and later destroyed as an airport complex. Local commercial-political interests aim at substituting industry and housing development. General aviation interests are girding to fight runway destruction which also, according to new defense concepts, would remove much needed runways in event of emergency. Support mounting for retention of all bases that would actively support defense effort in emergency.*

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fly for as little as $4 per hour

Slickest plane for flying clubs... the Piper Colt. Slickest plan for low cost club flying... the Piper Colt Club plan.

With 10 members it's only $100 per share to start with; less than $3 per week per member. With 20 members it's only $50 initiation fee and less than $6 per month per member to own a sleek, brand new maintenance-easy, safe-as-can-be Piper Colt. Actual flying costs are less than $4 per hour!

And the Colt's the best all-around plane for club use you can imagine. Ideal for initial instruction and solo—safe, simple, docile in the air; trouble-free on the ground thanks to tricycle landing gear, with large-size nose wheel. The Colt's ideal for cross-country, too; 115 mph cruise and a fantastic payload—enough allowance *and room* for all the baggage two people could ever need.

Why not get together with other air-minded friends and form a Piper Colt Club? For full information on costs, plus suggestions and hints on organizing a Colt Club just send in the coupon below.

PIPER AIRCRAFT CORPORATION
Lock Haven, Pa.

Please send me full information on the Piper Colt and the Colt Club plan.

Name_____

Address_____

G-2

MORE PEOPLE HAVE BOUGHT PIPERS THAN ANY OTHER PLANE IN THE WORLD

MAILBOX

LOW RATES VS. VOLUME

Much as I enjoy your magazine (particularly the tremendous editorials by Mr. Wilson) . . . I must take exception to a statement . . . referring to low rates for dual and solo time at one of the operations at Bowman Field ("Kentucky's Bowman Field," by Cecile Hamilton, November 1960 FLYING). To wit: . . . "their volume of 800 to 900 hours a month makes the low rate possible.

"I couldn't help but wonder if it isn't the low rates that make the 800 to 900 hours possible; in fact, inevitable."

May I point out two basic facts: (1) All over the country fixed-base operators are offering ridiculously low rates, yet they don't have much volume; and (2) no amount of volume can make it profitable to give dual instruction at $3 per hour for the instructor's time when you consider that no matter what pilot compensation plan is used, except paying the instructor $2.50 for each hour flown, it costs an operator at least $5 per hour to put an instructor in the air. If it costs $5 for the instructor, and you charge the customer only $3, the more volume you have the faster you go broke. These are simple economic facts of life.

Cheap rates do not account for the volume of the operator mentioned. His secrets for building volume go far beyond cheap rates. You do a disservice to the industry when you infer . . . that all an operator has to do to build volume is to offer his service at a cut rate.

Among members of NAFS there are operations with a volume of 1,200 to 1,800 hours per month with customer charges of $10 per hour in two-place equipment and $15 for four-place, *plus* a charge of $5-$6 per hour for the instructor. . . .

As management consultants to general aviation operations all over the U. S., we analyze operating statements. We know as a fact that it is not possible to have a healthy net profit unless you receive a fair and equitable price from the customer. For too long this industry has been under priced. . . . Please don't make it any harder for the operator by giving him false or misleading patterns to follow.

E. G. EGE, Exec. Dir.
National Assn. of Flight Services
Minneapolis, Minn.

INSTRUMENT TRAINING

My hearty congratulations to G. Courtney Chapman for his article, "Instrument Training, Facts and Fallacies" in the December issue of FLYING.

Courtney and I were both formerly instructors at the University of Illinois Institute of Aviation and so it is quite natural that we should have a high regard for the simultaneous contact instrument concept. The only question in my mind is how much benefit will the average student of today derive from this training at some future date unless he is encouraged to practice these same skills just as we who are instrument rated must maintain our proficiency.

It would be interesting to flight check some of these same students at say six months from the original flight test date to determine how much of this ability they have retained, and interesting to know also what percentage of these students would eventually obtain an instrument rating.

LAUREN BASHAM
Byerly Airlines,
Pueblo, Colo.

MITCHEL FIELD

Enclosed is a copy of a letter sent by our organization, Sperry Flying Club, Inc., to the Federal Aviation Agency.

It is our belief that it is the duty of the FAA to prevent Mitchel Field from being lost forever . . . We know we can count on your support in this program.

DAVID D. MARTIN
c/o Sperry Gyroscope Co.,
Great Neck, N. Y.

Federal Aviation Agency
Washington, D. C.

"Gentlemen: I am certain the announcement by the Air Force to close Mitchel Field on Long Island was received with keen interest by your office.

"It appears that at last a partial solution to the aviation problem in metropolitan New York is at hand.

"I feel that our group is representative of those who foster aviation in this area. We are an organization of over 80 members

who live and work on the eastern edge of New York City. Over the past 13 years our club has trained over 200 pilots. We feel this number would be much higher but for the fact that the prospective pilot must be prepared to spend two hours driving time to and from the airport in order to receive one hour of instruction. This travel time is considerably higher for persons living closer to the center of the city.

"Aviation on Long Island is increasing at a tremendous rate, yet to complete the paradox, airports are decreasing . . . One has only to compare the sectional chart of 20 years ago with today's in order for this to become evident. The fate of Roosevelt Field is still the cause of nightmares to New York's flying public.

"It is our fervent hope that your organization, dedicated to the advancement of aviation, will be able to help secure Mitchel Field for general aviation in the New York area.

(Signed) DAVID D. MARTIN

PLACE IN THE SUN

I thoroughly enjoyed your article by Oliver Stewart entitled "Place In The Sun" in the November issue of FLYING. I, and many others I'm sure, didn't realize the seriousness of the private pilot's situation in England.

It seems to me to be a great tragedy that private flying has taken such a seemingly total "power dive" in England since the

(Continued on page 6)

Piper Colt at Grand Bahama Club in the Bahamas, perfect "cruising" area for the Colt owner. (Wheel speed fairings extra)

NEW LOW-COST PIPER Colt 108

WORLD'S FIRST "COMPACT OF THE AIR"
with amazing flying ease and safety...120 mph speed ...18 miles per gallon economy.

START FLYING THE *New* COLT WAY
...perfect for beginners

Been wishing you could take up flying? It's the world's **most practical sport**... so useful in business, so much fun at the same time! Now, with the Colt, why put it off any longer? The Colt's the perfect beginner's airplane, for safety, simplicity and economy.

Learn so Easily with your local Piper Colt dealer. Thanks to low Colt costs he can offer new, lower rates. You can learn by taking individual lessons, learn while you travel, or learn in just a few days while on vacation.

Learn FREE when you buy your own Colt. Build up flying time and experience. Then, if you wish, turn in your Colt (at amazingly high trade-in value) for any of Piper's larger, faster planes—the just-announced 4-place Cherokee...world-record-breaking Comanche (180 or 250 hp)...twin-engine Apache...over-200-mph Aztec.

Piper Colt!—biggest news in private flying since the first Cub was built. **Piper Colt!**—the plane you've long been waiting for.

Piper Colt!—a speedy, roomy, cross-country airplane, yet designed with gentle flight habits for the beginner, at a price most people can afford—priced thousands of dollars less than any other airplane—priced at a sensational $4995!

Compact price, compact economy, but *big* performance and usefulness. Over 120 mph top speed, 115 mph cruise, 18 to 20 miles per gallon. Perfect for sportsmen pilots...ideal for many business travel needs... unmatched for flying club use.

See, fly the Colt at your Piper Colt dealer's (he's in the Yellow Pages) or send for information today.

ONLY $995 DOWN as little as $29.68 per week!

MORE PEOPLE HAVE BOUGHT PIPERS THAN ANY OTHER PLANE IN THE WORLD

PIPER Aircraft Corporation
Lock Haven, Pa.

- ☐ Please send brochure on the new Colt 108 and full details on learning to fly.
- ☐ Please send 1961 catalog showing Piper's complete line of planes.

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Address_____

G-2

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solutions to breathing systems problems for air and space travel

Puritan Aerospace

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Division of

Puritan Compressed Gas Corporation Since 1913

Breathing Life Into Air and Space Travel

MAILBOX

(Continued from page 4)

war, especially since it is caused by the one organization which should be promoting it, the English government . . .

This should be something of concern to American pilots . . . because things of this type have an amazing way of spreading, and all too often because the people it happens to didn't believe it could happen. In this day when air traffic in this country is at an all time high and rising every day it is very likely that our own government will begin to crack down on private flying to make more room for our commercial and business market.

One last word. Mr. Stewart mentioned the lack of enthusiasm for aerobatics in this country. I agree completely that there is a lack of interest in this area of private flying, an area which should be popular. After all, *aerobatics*, not *acrobatics*, are the real test of a pilot's skill, and skill is very important in modern flying.

MIKE MARDEN

Manhattan, Kan.

FLYING THE CARIBBEAN

The fine article by Allen C. Miner on "Flying the Caribbean" (November issue) once again highlights the new world of pleasure we have at our doorstep. The Palm Beaches are the natural gateway to the Bahama Islands, and West End, Grand Bahama is less than 90 air miles from West Palm Beach.

Your article covered the fine facilities at Fort Lauderdale, and Miami has been known for some time as a commercial airline center.

However the Palm Beaches, with excellent facilities, are beginning to offer all the advantages with the big plus of a beautiful tourist area and fine accommodations within minutes from the airport.

The operators at Palm Beach County Airpark, Lantana, Fla., offer the finest in service, and you can clear directly to the Islands from here. All the documentation and overwater equipment can be handled at Lantana. Just fly four miles south of Palm Beach International and look for the Piper or Gulf signs. Unicom will give you our location after you cross the Palm Beach omni . . .

JAMES D. TILFORD JR., vice president
Palm Beach Aviation, Inc.

QUITE BY ACCIDENT

I have been reading with interest your magazine for the past year. It was quite by accident that I happened to pick one off the newsstand and became so interested, it encouraged me to learn to fly. As a result I have had many pleasant hours both as an armchair pilot, reading such as "I Learned About Flying From That?" and, as a student pilot flying a Cessna 150.

I will have to agree with Mr. Quesada (February 1960 FLYING) when he states there is a need for more standardized instructions. I believe that one way to accomplish this end would be through the use of films. At least films would make it a little easier for those of us who are unable to attend ground school. Do you have a listing.....?

FLOYD G. WIDSTEEN

Hayward, Calif.

• *Check with your State Aeronautics Commission for available film sources. You may also be interested in a number of good long-playing records now on the market designed specifically for home training.*—ED.

THE SMITHSONIAN REQUESTS

. . . In a magazine you published between July 1944 to January 1946, called "Industrial Avation," we have seen many photographs of aircraft cockpits . . . Could you supply us with these photographs . . .?

In addition, we have also found that many of the articles would be a valuable addition to our periodical collection. Do you know of anyone who might be willing to donate a set of "Industrial Aviation" to us for use in our Periodical Reference Library?

PHILIP S. HOPKINS, Director
National Air Museum
Washington 25, D. C.

• *Unfortunately* FLYING *could not comply with Dr. Hopkin's request, either for back copies of* FLYING*'s "Industrial Aviation" or photos. Dr. Hopkins would be pleased to hear from anyone who might still have copies of this magazine on hand.*—ED.

HOUSE DIVIDED

Your editorial "As in the Beginning" in a recent issue of FLYING had more than the usual significant comment found in your fine editorials. I am delighted to see that the pulling and hauling among the various interest groups in aviation bothers others such as yourselves.

As one reads through the editorials of all of the aviation magazines, it is hard not to conclude that each segment of aviation is operating to the direct detriment of the others.

Certainly the revitalization of the National Aeronautic Association is the key to stimulation of the development of the progress needed even in the lowly levels of the atmosphere. While matters of military and political tactics demand nothing less than spectacular progress beyond the atmosphere, to allow aeronautical development to atrophy now would be like stopping automobile development at the advent of the DC-3. I, for one, am sure that American aeronautics will split and atrophy without the guiding voice you describe.

I would like to help. . . .

NEIL D. VAN SICKLE, Brig. Gen. USAF.
Hdq. Pacific Air Forces
APO, San Francisco, Calif.

TO ERR IS HUMAN . . .

. . . The Plumly Manufacturing Company release, regarding the navigation computers (mentioned in your October "Briefings"), through an oversight on our part carried the address of 705 Dan Waggoner Building, and the postman now tells us that he returned countless letters mailed to that address. We are extremely sorry.

For all your good readers who would like this practice computer (50 cents) the correct address is: 3900 Tamworth Road, Fort Worth, Tex.

ROWLAND BROILES ADVERTISING CO.
Fort Worth, Tex.

NEW PANEL. Full instrumentation right in front of the pilot, radios grouped conveniently near center, (room for complete 2½ system plus ADF), plenty of room for extra instruments, plus map compartment.

GO FAST! GO FIRST CLASS!

GO COMANCHE for '61

You'll be pleasantly surprised when you fly the new, more-beautiful-than-ever 1961 Piper Comanche—with either 180 or 250 Lycoming horsepower. You'll find new flight-ease and comfort features everywhere for you and your passengers. New panel, new toe brakes, new automatic flight, new radio navigation packages and systems, new cabin heating and cooling *plus* the wonderful, just-right handling characteristics which set the Comanche apart as a plane the pros really love to fly ... a plane beginners feel at home in.

AND NOW! 1600 MILE RANGE FOR COMANCHE 250

With approved gross up 100 pounds to 2900 pounds, the 250 hp Comanche now has 90-gallon fuel capacity as standard in the Super Custom and Auto-Flite models—good for over 1600 miles at economy cruise. There's long range, too, with amazing economy in the 180 hp Comanche—over 1100 miles with 60-gallon capacity.

MORE THAN EVER YOUR GREATEST VALUE

With the biggest useful load ... roomiest cabin ... with superior aerodynamic efficiency *plus stamina* proven by 3 world non-stop distance records ... the Comanche is easily and surely your best value in the high performance, single-engine field. See for yourself at your nearest Piper dealer's or write for 1961 Comanche brochure, Dept. G-2.

OFFERED WITH THESE *Exclusive* **FLIGHT-EASE FEATURES**

PIPER AUTOCONTROL. Standard on AutoFlite Comanche. Holds any course precisely with heading lock, makes turns automatically, too. All-transistorized.

ALTIMATIC PILOT. Turns automatically to any pre-set heading; climbs to, descends to, then holds any pre-set altitude precisely. Ultimate in restful automatic flight. (Optional)

PIPER AUTO NAV. New Piper-perfected radio navaid provides LF and standard broadcast reception plus automatic homing at surprisingly low cost. (Optional)

PIPER *Comanche*

PIPER *AIRCRAFT CORPORATION • LOCK HAVEN, PA.*

ATTRACTIVE LEASE/FINANCE PLANS

BRIEFINGS...

Reduction in cabin noise level up to 20 per cent and an increase in speed of three to five mph are two improvements in the Cessna Models 310, 310A and 310B when the engine exhausts are modified by AMC Augmenter Tubes on the engine exhausts, according to J. J. Connor, manager of AMC

Augmenters, Tucson, Ariz. The FAA-approved kit, including instructions and drawings, sells for $884. Installation requires only one or two days, may be done at home base with help of a mechanic or at AMC's facility located at 2648 N. Campbell, Tucson.

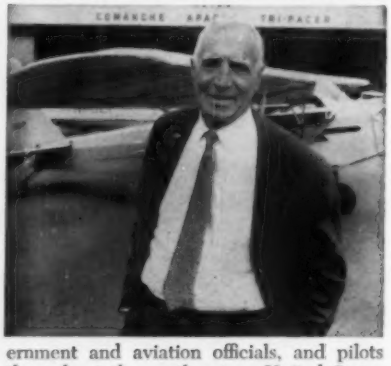
Speedier action on certification of modified aircraft is promised through a new five-point program recently adopted by FAA. The new program specifies (1) an improved system of data dissemination between FAA regions in which modification firms are located. (2) Increased authority may be given to industry facilities through a new rating "Approved Modification Station." (3) Improved guides for FAA personnel. (4) The industry will consider drafting a new CAR pertaining to large aircraft used for business purposes. (5) The industry agrees to advance planning in modification operations in order to give FAA sufficient warning of peak loads.

Price reduction of up to three and one-half per cent, coupled with twin bonuses of increased performance and payload for all three of its new 1961 commercial models, has been announced by Bell Helicopter Co. The Bell 1961 line includes the all-new three-place 47G-2A powered by a Lycoming VO-435 engine with takeoff rating of 240 hp and maximum continuous of 220 hp; the improved three-place 47G-3 with Franklin 6VS-335A 220-hp turbosupercharged engine; and four-place executive 47J-2 with a Lycoming VO-540 250-hp rated engine. Major feature in all three is interchangeability of components: main and tail rotor blades, main rotor hub, transmission and other parts.

Flight facts, a new monthly information service offering current data for VFR flying, has been announced by the Indianapolis publishing firm of Howard W. Sams & Co. Designed for both preflight planning and inflight operations, the service will include data supplied by airport operators and agencies responsible for airport facilities and flight aids and communications.

U.S. Office of Education is offering single free copies of a new supplement updating its "Bibliography of Books on Jets, Rockets and Space Exploration." Requests should be addressed to Willis C. Brown, specialist for Aerospace Education, Washington, D. C.

William Thomas Piper, founder and president of Piper Aircraft Corp., observed his 80th birthday anniversary on January 8, 1961. He was born at Knapps Creek, N. Y. Coincident with Mr. Piper's anniversary, the new Piper factory at Vero Beach, Fla. was dedicated with an open house. Gov-



ernment and aviation officials, and pilots throughout the southeastern United States gathered at Vero Beach to pay tribute to Piper. The event also marked the first public showing of the new Piper Cherokee, four-passenger, all-metal, low wing business and sports airplane.

Qantas, Australia's international airline, has marked its 40th Anniversary. One of the oldest airlines in the world, the company was registered in Brisbane, November 16, 1920 as "Queensland and Northern Territory Aerial Services Ltd." Its original paid-up capital was around $25,000, raised largely through the company's first chairman, grazier Fergus (later Sir Fergus) McMaster and two young ex-WW I pilots—W. Hudson Fysh and P. J. McGinness. Sir Hudson Fysh is now Qantas chairman and president-elect of the International Air Transport Assn.

Membership in the National Assn. of Air Traffic Specialists, a group of FAA flight service specialists, increased about 150 per cent between June and October, 1960, according to Russell M. Woodson, executive director. NAATS was formed two years ago by merger of the Communications Operators Guild and National Assn. of Flight Assistance Specialists, with national headquarters in Venice, Fla.

Skycrafters, Inc., of Long Beach, Calif., manufacturers of aircraft radios and other aviation electronics, has purchased the entire inventory of Aero Signal Labs (A.S.L.) of Phoenix, Ariz. The ASL inventory has been moved to Skycrafters' Long Beach facility, and henceforth orders for the ASL Birddog RDF-2C will be shipped from there. Warranty obligations on ASL equipment have been assumed by Skycrafters.

FAA revises communications program, extending until Jan. 1, 1966 the date for unrestricted implementation of channel assignments using 50 kc separation. The agency notes that 50 kc assignments below 127 mc will be progressively implemented, beginning Jan. 1, 1961, "as may be required" for both terminal and enroute services, primarily in high density areas. The

(Continued on page 106)

Downtown New York Heliport—Backdropped by skyscrapers of Manhattan's financial district, the borough's second commercial heliport became operational on December 8. New York Airways will operate the new East River facility, as it does the W. 30th St. port opened in 1956, providing 22 daily flights to and from the city's major airports. Built by the N. Y. Port Authority at a cost of $230,000, the heliport includes parking and loading area for helicopters, a one-story terminal building in addition to an automobile parking area.

November 3, 1960

[illegible]ight
[illegible]al Sales Manager
Collins Radio Company
Cedar Rapids, Iowa

Dear Sir:

My Super V around-the-world flight was completed in 8½ days, averaging eighteen hours a day of flying. I flew in all climates, all weather, all around the world over the most extreme conditions, (for this was in October - perhaps the worst weather of the year). The Collins VHF and the Collins VOR was this good:

When I landed in Monterey airport, the tower operator called me to ask me what kind of VHF equipment I had on board. I told him that it was Collins. He said that he had never heard such high quality equipment. He was right!

When I landed in Karachi, ATC and the tower came over to see the aircraft because they said that they had never heard such fine VHF equipment.

As I approached San Francisco, I was on a Unicom with four other aircraft. Every time that I spoke, the volume had to be turned down; however, every time the others spoke, it had to be turned up for two reasons: One, strength; two, clarity. They said at San Francisco that the clarity and integrity of the transmission was remarkable.

I am proud that I had Collins equipment for two reasons. One, because of the high quality of the equipment; two, because of the safety of the use of such equipment. By using Collins VHF equipment my flight around the world was safer - and that is most important to me. I would certainly recommend this equipment to anyone flying around the United States, for I used it across the oceans, deserts and under every imaginable condition and at no time did the equipment falter.

I think that it is remarkable enough to have flown around the world eighteen hours a day in 8½ days and to have had the Collins VOR and VHF equipment operating fully at all times. I was able to use the VHF for tracking out and tracking in. It was my source of navigation. I had one ADF omni VOR and the VOR gave me excellent information.

Most sincerely yours,

Chuck Banfe

Chuck Banfe

CB/bb

Chuck Banfe comments on Collins around-the-world dependability

Recently, Pan American pilot Chuck Banfe completed a solo flight around the world in a light aircraft. His Super-V Twin was equipped with Collins 618F-1 communication transceiver, 51X-3 navigation receiver, 344D-1 VOR instrumentation unit and 427B-1 power supply—all off-the-shelf lightweight items available from your nearest Collins distributor.

COLLINS

COLLINS RADIO COMPANY • CEDAR RAPIDS, IOWA • DALLAS, TEXAS • BURBANK, CALIFORNIA

If you're not a bookworm . . .

but love to tinker with tools

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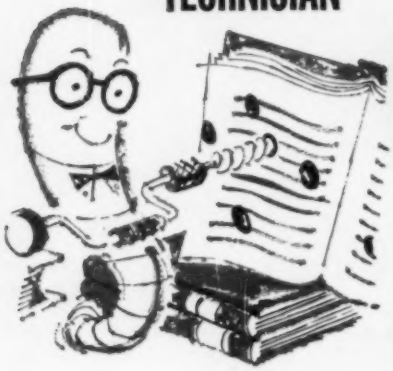

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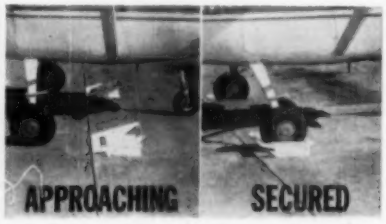
NEW PRODUCTS

Successful development of a combined audio control panel and isolation amplifier has been announced by The Bendix Corp's Radio Division, Baltimore. For use in single-pilot twin-engine aircraft, the new unit —CNA-30A Audio Control Panel—provides a systematic array of all switches and controls required to operate two transmitters, six receivers, and an interphone circuit, as well as marker-sensitivity and range-filter controls. Three watts of audio power are

provided for operation of cockpit loudspeaker. The CNA-30A weighs less than two pounds; measures 5¾x1¾x5¾ inches. Its front panel control arrangements may be varied for custom installations.

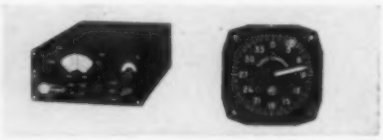
Transistorized ATC transponder under development by the Hazeltine Corp., Little Neck, N. Y. is soon to go into production. Trade-named GAT (general aviation transponder) the device is designed for 150-mile range, all 64 Air Traffic Control codes and position identification. The manufacturer and National Aeronautical Corp. (Narco) are currently discussing arrangements whereby the latter would market and service this product.

Automatic wheel chock, designed for tire sizes from light twin-engine aircraft down, is marketed by Plain-Aids Mfg. Co., (Box 801) Soquel, Calif. Called Auto-Chock, its two moving parts provide positive gravity locking and cocking as plane is taxied into chock. A slight toe pressure releases mechanism on departure. At excessive approach speeds the chock will not lock; automatically recocks for a second approach. May be permanently or temporarily installed. Weight about 28 pounds each. Price $19.95 each; $37.50 the pair f.o.b. Add four per cent sales tax, California.



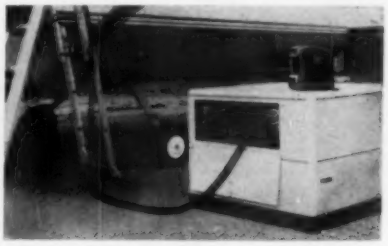
Spray pumps for agricultural aircraft, designed to meet application rates in excess of 10 gallons per acre and installation requirements for the Piper 18A and Pawnee, Callair, and other light aircraft, are now available at Agricultural Aviation Engineering Co., Santa Clara, Calif. A mount for Stearman installations, is provided as well. Compact in design, the 6600 series pump is offered in three versions. Standard pump is provided with an adjustable pitch fan or fixed-pitch wooden or metal fan. Prices start at $77.20.

Aircraft Radio Corp. has entered the single-engine aircraft market, through its new Starflight III group, with a compact ADF system, Model 501A, selling for $950.



Operating from the primary aircraft power supply, the system centers around panel-mounted complete receiver (left) which includes tuning meter. Use of both transistors and vacuum tubes in receiver provides top operating efficiency over wide temperature ranges. Additional components include amplifier unit; electrically compensated loop antenna and IN-501A Indicator (right) with large luminous dial. Total weight: 14.2 pounds.

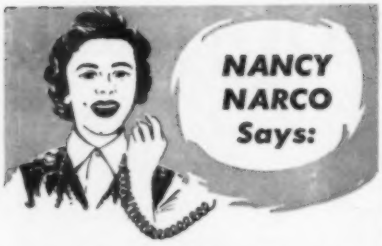
Ardmore Products, Northbrook, Ill. is marketing a new airport refueling station factory assembled and ready for use when connected to fuel storage tank and power supply. The Ardmore Airport Refueler Station, 38 inches high, is equipped with swiv-



el register, 60 feet of hose. Available in either 30- or 60-gallon per minute delivery capacities, the unit rests on concrete or gravel and cover door may be closed and locked to prevent tampering.

Dual marker beacon transmitter (station), Model 429B, is announced by Wilcox Electric of Kansas City, Mo. Designed for use as either an ILS approach marker or low-power airway marker, this station consists of two 75-mc transmitters and accessory equipment, including automatic changeover and power supply, contained in a single housing, plus the counterpoise and antenna. Also available are special configurations of this unit, including a single-unit transmitter version.

Illuminated check list for private and utility aircraft is introduced by Plasteck, Inc., Poteau, Okla., original designers of similar check lists for commercial and military aircraft. Trade-named "Check List, Junior," it is available in eight-slot and 12-slot models, containing 16 and 24 items, respectively. Weight less than one pound. In colors Desert Tan, Midnight Blue or Royal Red. When ordering, specify aircraft's takeoff and landing check list items. The eight-slot model, $24.95; 12-slot, $29.95, pp.



ORDER OUT OF CHAOS

Things got mighty involved for a while during the recent F.A.A. frequency planning sessions. The kind of information that kept filtering out shook up some of the boys in the pilots' lounges. It all had to do with VHF channels, 50 KC, 100 KC, "implementation dates," IFR, VFR—and just for good measure—TSO.

It began last May when FAA proposed a plan to increase VHF channel utility. About ten seconds later panic buttons were being pushed through the firewall and the sky started to fall down. Meetings, letters, accusations and aggravations were tossed about at random. The problem is simply one of needing more COMM channels for ATC. The FAA channel-pickers in the back room are having a tougher and tougher time picking channels so that Cleveland Approach Control doesn't interfere with St. Louis Center, etc. The object is to keep an aircraft from receiving messages on the same channel from two different places. The higher the bird goes the further apart these places can be. For instance if there's a New York Center frequency of 125.2 with the transmitter on a Pennsylvania hilltop talking to a jet at 33,000 just east of Pittsburgh, the same frequency can't be used again until you've gone as far west as Indianapolis. Air to air interference at those altitudes can carry 500 miles with no strain. Nobody quarreled with the need for more channels. But the chaos came from the plans of "how we get there from here."

FAA's fear of finding frequently fouled-up frequencies was so great that they figured their best bet was to try to blast all users into using sophisticated, multi-multi-channel TSO COMM equipment. Like right now. So they set up a target date of 1963.

In August a big Washington roundtable was held with all General Aviation interests attending. The happy outcome was a sound, reformulated plan just announced. First of all, TSO will be required only in airline operation—not general aviation. Second, the 1963 date is out. Last and most important, 90 channel, 100 KC radios like the Mark V will handle *all* VFR *and* IFR jobs for many years to come (below 24,000 feet, that is). Only for IFR after 1966 will it get inconvenient to use Mark V as a primary COMM. Although 50 KC channels will be getting installed during the 5 year interim, 100 KC channels will be available "on standby."

Happy New Year!

Nancy

NARCO • Ft. Washington, Pa.
FLYING—February 1961

NARCO SCORES AGAIN!

with a

190-CHANNEL CRYSTAL-CONTROLLED
VOR/ILS LOCALIZER INDICATOR
VHF COMMUNICATIONS RECEIVER

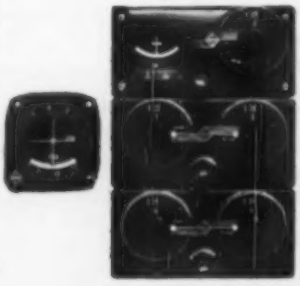
NEW *narco* MARK VI

Here's the answer to the need for an independent VOR/ILS localizer receiver/indicator—the Narco Mark VI. Gives you the convenience of fast, positive crystal-controlled tuning to all NAV/COMM frequencies between 108 and 126.9 megacycles. Lets you add a second Omni with minimum space and cost, without tying up your communications radio.

Weighs just 6½ pounds and requires only 3" by 6¼" panel space; completely self-contained, no separate power supply needed. Same size as the popular Narco Mark V, same fine crystal-tuning feature, exceptional accuracy, completely dependable for IFR operations.

MAKES POSSIBLE THE "ULTIMATE IFR SYSTEM" FOR LIGHT TWINS AND SINGLE-ENGINE AIRPLANES AT PRACTICAL COST

The Mark VI with two Narco Mark V's—one with Omni attached—gives you a complete "2½ System" for complete navigation and communications service.



- **Mark VI** for primary navigation always available for VOR or ILS.
- **Mark V** with VOR/ILS attachment—provides second Omni plus all-channel crystal-controlled communications.
- **Mark V** for primary all-channel communications always available for direct Center, Approach Control or Tower communications.

OR BUILD UP YOUR SYSTEM

Replace your older, limited-channel, tunable-receiver NAV/COMM equipment with a Mark VI for VOR/ILS navigation and a Mark V for all-channel communications. Add other equipment later.

narco

See your Narco distributor or write for new Mark VI brochure

narco

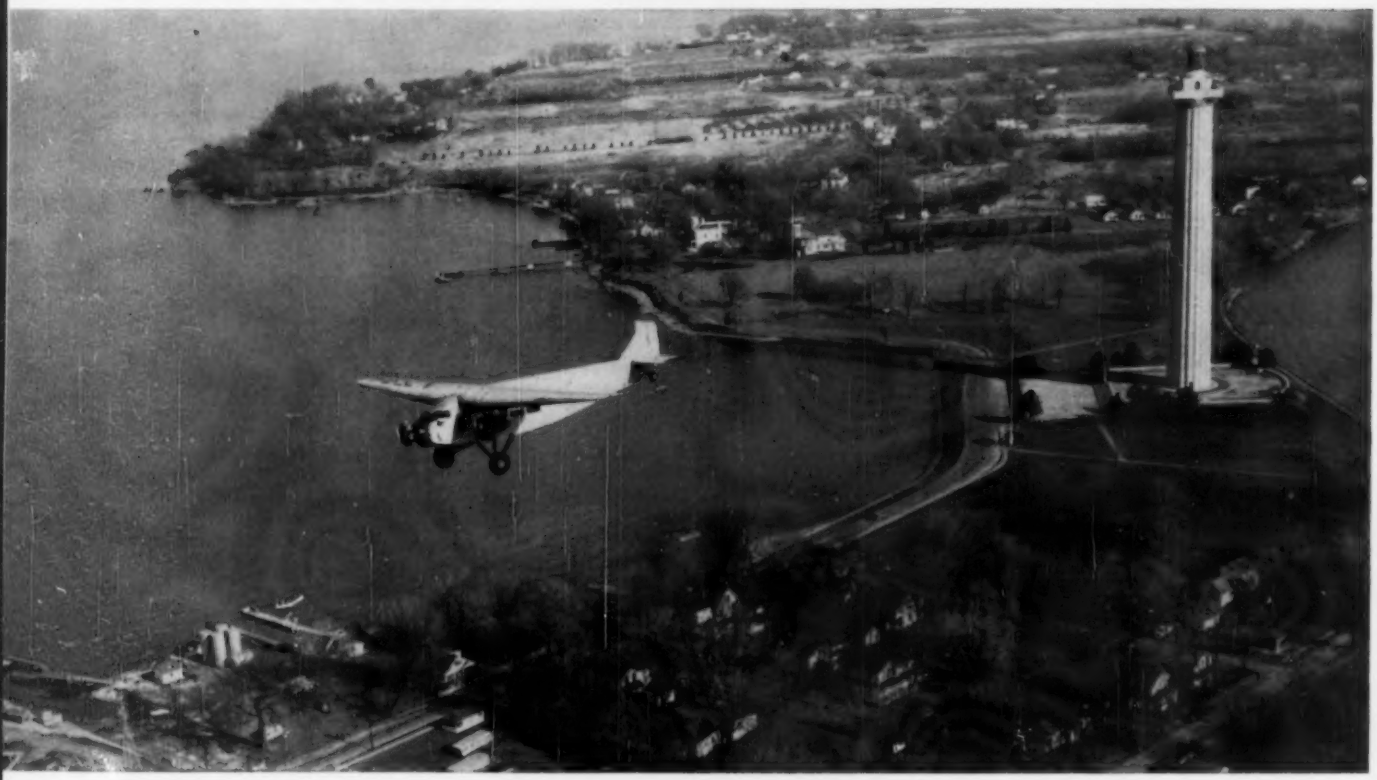
NATIONAL AERONAUTICAL CORP., FORT WASHINGTON, PA.

(Advertisement)

Tin Goose Island-Hoppers

A behind-scenes report on ISLAND AIRLINES, of Port Clinton and Put-In-Bay, Ohio. Operators of a tin goose tourist service . . . flying school bus . . . corrugated commuter express . . . and ketchup-to-kitchen-sink delivery service. Via venerable Ford tri-motors, vintage 1928.

by HERB FISHER, international aviation authority, veteran test pilot, author



Saga of the skyways . . . last of the Ford tri-motors in airline operation, still on the wing with passengers and cargo after 33 years! Scene is the Perry Monument at Put-In-Bay.

"Maybe you think you've flown everywhere *in everything*. But you haven't lived until you've tiddlywinked around Lake Erie's resort islands in a 1928 Ford tri-motor! That corrugated metal bird behaves like a cross between a helicopter and a grasshopper!" This sage summation typifies those of aviation veterans who've taken the "tin goose tour" of the historic Put-In-Bay area. Of 11 Ford tri-motors known to be still flyin', Island Airlines owns two . . .

You roll a third the length of an aircraft carrier and "grasshopper" off the Port Clinton airstrip. Grossing at 10,000 pounds, you lumber along imperturbably at 80 mph (on 235-hp 7-cylinder Wright radial engines) some 500 feet above open water. You share space with piles of groceries. The second tri-motor pulls alongside—on a freight run—a load of coal and a live cow. It's foggy. You eye the "instrument panel."

"How come so few dials?"

"Don't need many, Herb," grins Chief Pilot Harold Hauck. "No radio, no mixture control—we've got these levers and foot pedals, and a crank and this here ol' steering wheel . . ."

Your "weather forecasting system" is Put-In-Bay's granite monument commemorating Commodore Perry's inland sea victory over the British in the War of 1812: "If we can see the monument *ahead*—as the mainland disappears *behind*—then we've got operational visibility. If we see its top, we've got ceiling enough." The rest of the flight is simply "feeling out" familiar landmarks.

The two tri-motors flip from island to island, transferring commuting businessmen, gawking tourists, the first part of a 14-ton shipment of Christmas wine from island vineyards, squawking crated chickens, shopping housewives, U.S. Mail, somebody's new piano, fresh-caught fish, and youngsters who regard a *flying* school bus as just another daily duty. Your GCA to one fog-shrouded airstrip is a jut of land (turn), two tall trees (line up), a boulder (close throttle), a bog (drop), and the frayed end of a ribbon of asphalt (touch down).

Unique. Offbeat. A mixing of the jenny age with the jet age. It's all of that. And more: In a quarter century of operation—year-round, 7 days a week, vital engine components like spark plugs fully exposed to 10-below Arctic blasts or 90-above moisture-heavy heat—*the tin goose airline has never had a fatality*. And those incredible tri-motors average a takeoff or landing every six minutes—9,000 a year! And they carry 35,000 scheduled passengers a year—plus charter fares! Theirs is a record of safety, dependability and precise regularity that would make any big-brother airline green with envy.

Maintenance Supervisor Rodney C. Lewis installs Champion spark plugs: "We've tried other brands—threw 'em away at 100 hours. Champions? We clean 'em every 100 hours, put 'em right back in. They just *don't* foul out—they give you *full* power *any* time you want it."

Chief Pilot Harold Hauck, 9,000 hrs. in Ford tri-motors and crack mechanic, and Ralph I. Dietrick, 20,000-hr. pilot and president of Sky Tours, Inc., of Sandusky, a 16-plane charter service (Champion-fired Cessnas, a 1933 Boeing, the tri-motors). Sky Tours operates the *tin goose airlift* for 8,000 year-round island residents plus thousands of vacationers, hunters, fishermen.

"Yes, we do have a couple of claims to fame—the taking-offest-and-landingest airline in the world, and the shortest," said Base Manager Newell P. Witte, a 10,000-hour pilot. "Our longest flight leg is 11 miles; shortest, 2 miles. You might say we're the only airline where wheels are still rolling from the last takeoff as you come in for a landing! Up and down like this *constantly*, exposed to the worst kind of operational extremes year after year, those planes and engines take one hell of a beating. That's why we *demand the best* of ourselves in shop maintenance and in parts and equipment. That's why we demand Champion *Foul-Resistant* spark plugs, Herb. We've *got* to have *continuous* full-firing power—available at any moment for any eventuality."

You couldn't pay some of the old-timers around here to get near a modern airliner. Yet the ancient tri-motors are such a part of their lives—they have such confidence in them—that they think no more of boarding one than the average city-dweller would of boarding a bus. Like its wingless relative, the Model T, the Ford tri-motor never seems to wear out—it just simply goes out of style.

"That's the problem," says Ralph I. Dietrick, the airlines' president. "These tri-motors are a vanishing, nearly extinct American tradition—the first and oldest metal workhorse of the skies. For load-carrying capacity and short takeoff/landing, they're irreplaceable—the only type aircraft we can use. Yet, no one makes parts for them any more. Engines—sure, we bought up hundreds of war-surplus Wright engines for $15 apiece, and as long as we fire them with Champion plugs, we have no trouble. But *airframe parts*—fittings, corrugated aluminum and so forth—that's our prime headache. We have to *make* these parts—according to FAA original-equipment specifications. If anybody reading your article, Herb, has *any* kind of Ford tri-motor parts stuck away in his barn, we'd sure appreciate his contacting us!"

Maintenance is done in new facilities at Port Clinton Airport. Transient aircraft, too, get economical service from Island Airlines' crackerjack mechanics. Visiting pilots get the red carpet—including a whirl of the islands in those flying museum pieces. (And let me tell you, that $3 trip is a flying adventure that no amount of money will be able to buy in a few years!)

Don't miss Rattlesnake Island: The big goose drops suddenly toward a piece of pasture that the flight deck of the Enterprise could hold three of. You figure the pilot's cowboying—nothing *but* a helicopter could land there. Then, matter-of-factly, you're settling between a barn, a cliff and some high jack pines. Wing clearance, 30 feet. You drop gently onto wet grass, brake to a turnaround stop at the brink of Erie's rocky shore.

"That's *why* we'll still be operating Fords here when man lands on the moon," Hauck says. "There's just not another plane this size that can do what these can. They'll even fly backwards, Herb. I was fighting headwinds one day and a ferry boat passed me up . . . a few minutes later, gusts topped 65 mph and my goose was going only 15 miles an hour—*straight backward.*"

CHAMPION SPARK PLUG COMPANY • TOLEDO 1, OHIO

● **Dietrick and Hauck** inspect tri-motor overhaul in Island Airlines' new quarters at Port Clinton. First time the wing had been off in 33 years! Unique wing strength of tin goose is due to cantilever, bridge-like construction. Problem: replacement fittings and corrugated "skin" patches. Anybody got any?

Linda Burris, 14, and brother Dale, 16, take "flying school bus" to/from classes every day, think nothing of it. Nearly 400 "plane rides" a year! Believed only place in U.S. where school board appropriates funds for *flying* school bus. Reason: school on one island, home on another, law-of-the-land over all.

They'll do it again in '61

(Like They've Done Each Year Since '32)

Rampfull of Grumman Gulfstreams

On each day of each year for 29 years, America's newest and finest business airplanes have been seen at Southwest Airmotive.

They don't get lost and blunder in here by accident.

They come purposefully because their pilots and owners WANT them here where service matches the quality of flying's proudest products.

1961 will be no exception.

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434 S. WABASH AVE., CHICAGO 5, ILL.

WHO and WHERE

A. R. Bell, vice president-general manager, Beech Acceptance Corp., is named director of Beech Aircraft Corp., Wichita. Also elected to board positions are Leddy L. Greever, vice president—domestic sales, Beech Aircraft; Wyman L. Henry, vice president—marketing; and James N. Lew, vice president—engineering.

A. M. Scott, chief engineer Rolls-Royce of Canada Ltd., Montreal, has taken on additional duties of manager, Aero Engineering sales and service departments.

C. N. Sayen for the fifth consecutive term elected to head the Airline Pilots Assn.

William J. Mitchell, vice president of traffic and sales for Bonanza Air Lines, is recently elected president, Air Traffic Conference, a division of the Air Transport Assn. Elected vice presidents: William L. Morrisette of Eastern Air Lines; C. Gordon Brown, Piedmont Airlines.

Marion A. Higdon, 20-year pilot with the Navy, has joined the Chemstrand Corp., Decatur, Ala., as a company pilot.

B. A. Erickson has been promoted to a new executive post in the operations department at Convair, Ft. Worth, and Richard Johnson assigned to fill Erickson's job as manager of the flight department. Both men have outstanding records as Convair test pilots.

Edward L. Falls, Jr. replaces Kenneth M. Miller, resigned, as general manager of Motorola Aviation Electronics, Inc., at Culver City, Calif. He has been with the company since 1948.

E. H. Fitch, B. F. Goodrich Aviation Products Div., Akron, O., heads Aviation Distributors and Manufacturers Assn. during 1961. New vice presidents are: George Galipeau, Van Dusen Aircraft Supplies, Teterboro, N. J., and H. Webster Crum, Lycoming Div., Avco Corp., Stratford, Conn.

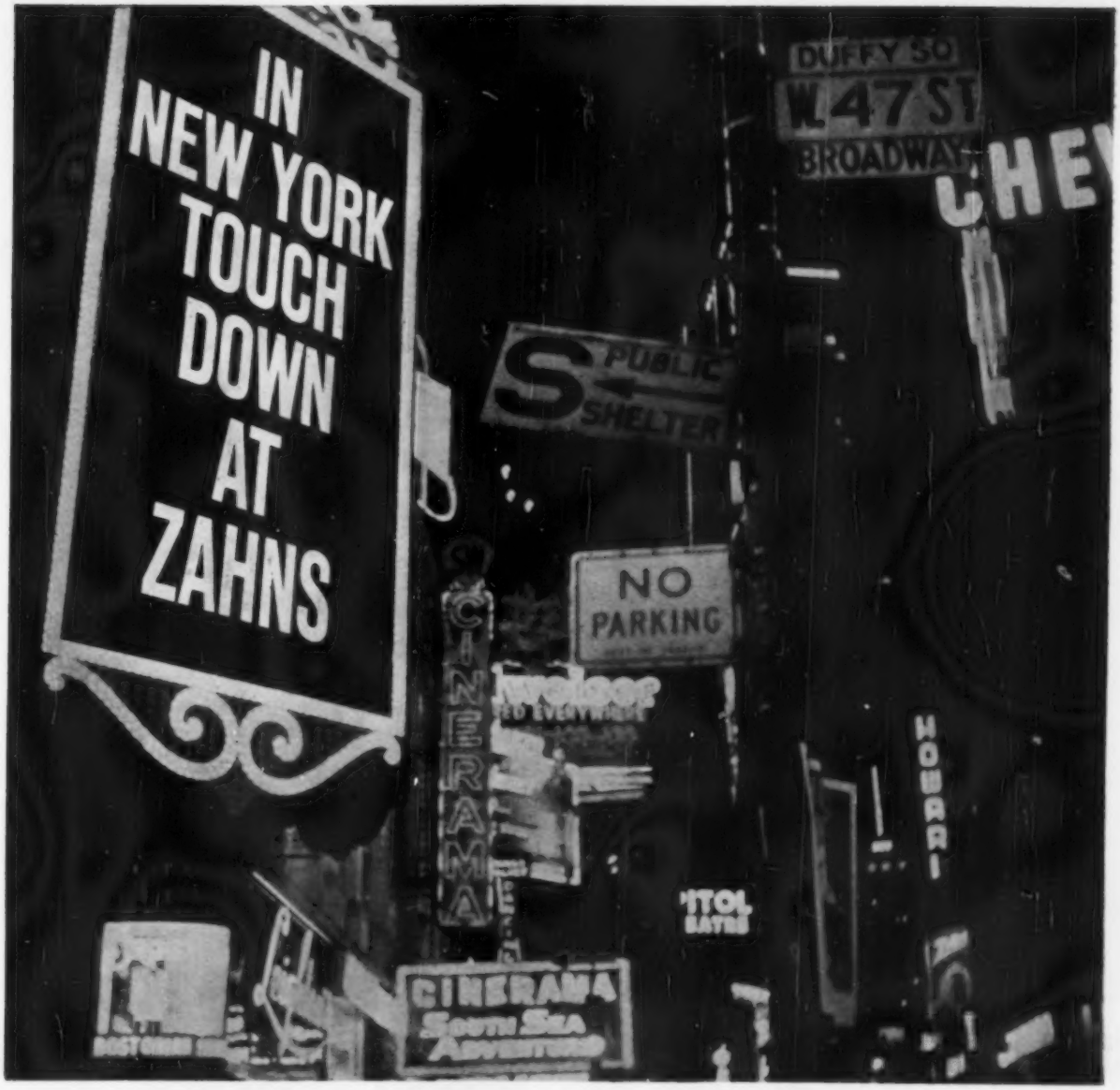
Gene L. Meyer, named mid-western aviation sales manager for A.C. Spark Plug at Chicago, replacing Charles S. Lucas, transferred to Richardson, Tex., as southern district manager.

Max Elbaum is appointed chief modification engineer for L. B. Smith Corp., Miami, Fla.

J. Patrick Murphy, pilot-sales manager for General Aircraft Supply (subsidiary of Airwork Corp., Millville, N. J.), has been named general sales manager at Detroit.

John M. Wells of Southbridge, an original member of the Massachusetts Aeronautics Commission, has been named chairman of the Commission, replacing Edw. J. Lynch.

Roscoe Turner, noted aviation figure and president of Roscoe Turner Aeronautical Corp., Indianapolis, was named Man-of-the-Year for outstanding contributions to aviation at Beech Aircraft's recent International Sales Meeting. Al Chapman, salesman for Tulsair Distributors, Inc., Tulsa, received the Tom Patton Award for customer relations and service.



HARD SURFACED RUNWAYS 4200'/ADF INSTRUMENT APPROACH/TELETYPE/ROTATING BEACON/FAA OFFICE/DIRECT LINE TO ATC, ATCS, IDL/UNICOM/ RUNWAY LIT ALL NIGHT/HERTZ CARS/MOTEL/FINEST IN FACILITIES FOR MAJOR OVERHAUL/SALES AND SERVICE IN AERONAUTICAL RADIO

DOT AIRTRONICS /*The east coast's finest aeronautical radio, sales, service and custom installation facilities . . . Distributors for Collins, ARC, Dare, Flighttronics, Lear, Narco. Service and facilities for all manufacturers including Bendix, Sun-Air, Wilcox, Sperry, etc. Producers of the new Systems Integrator® /TUrner 8-0010.*

ISLAND AIRMOTIVE /*The finest in major overhaul . . . guaranteed. Specializing in Continental and Lycoming engines. A complete line of parts stocked. New engine type warranty, labor done on flat rate. New and remanufactured engines available for exchange. Maximum quality . . . minimum downtime/MYrtle 1-1700.*

AMITYVILLE FLYING SCHOOL /*FAA approved advanced flight school, specializing in instrument and multi-engine ratings. Part time or accelerated courses; private, commercial, flight instructor, business pilot, helicopter, radio navigation. Piper sales and service.*

Long Island, New York/AMityville 4-4200

ZAHNS AIRPORT

Gulf aviation products GULF

CESSNA

announces an even greater

CESSNA 310F for 1961

with an added pair of windows sharpened nose contour slimmed tip-tanks long, flat nacelles new interior stylings and a host of other improvements that make the new Cessna 310F

the world's best all-around light twin

CESSNA FOR '61

310F

MONTE GREEN

● AIRLINE TERMINALS

● EXECUTIVEPORTS

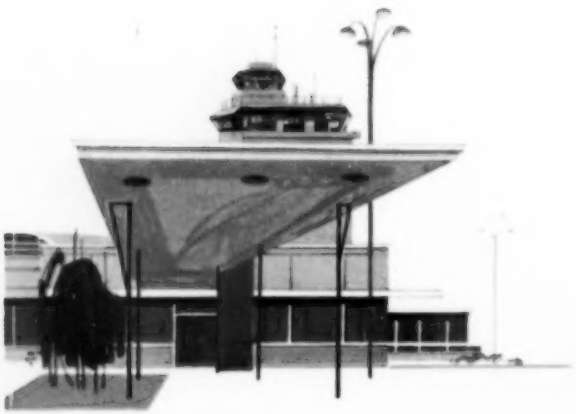
How much extra management efficiency is there in 5400 extra Cessna executiveports? Listen carefully and you might hear the sound of a **timepiece**... ticking off talent... management talent... your talent. In sixty-five ticks you and your management talent could be four miles away from where you now sit... on a key management mission... aboard the world's best all around, light, twin-engine executive aircraft — the Cessna 310 F for '61.

For the next minute consider this appealing travel fact: You won't have to transfer, to stop and go... your big, luxurious 310 F takes you directly to your choice of 6,000 destinations — 9 out of 10 places an airline ticket can't! Work and plan while you travel — as far as half way across the nation — non-stop! Then convert the extra time you conserve into action. Leave your competitors behind! First step: See your Cessna dealer. NOW.

HOW MUCH?

There's a "how much" bonus everywhere you look . . . every-time you fly . . . aboard the 310 F . . . the world's best all around, light, twin-engine executive aircraft! **Twin 260-hp Continental engines,** with continuous flow fuel injection, give speeds up to 242 mph. **Flight-quiet muffler** design conspires with "quiet zone" cabin sound conditioning to preserve conference-room quietness. **Five versatile seating arrangements** permit you to pick and choose three magnificent color selections from five distinctively different interior seating plans. **Two-speed electrical auxiliary fuel pumps** installed in each tip tank assure maximum safety. **Optional auto pilot** gives you new mastery of the air . . . makes long cross-country trips a pleasure! **Electrically operated split-type,** dual-purpose flaps offer high lift for shorter, higher performance take-offs and high drag for shorter, softer approaches into small fields. **Full flight/sweep, all-weather vision . . . spacious baggage compartment . . . extra wide cabin door** . . . all this and the "two of everything that counts" concept that provides true twin-engine safety for the 310 F . . . also provides you with truly twice the buy! How much to buy and fly? Ask your Cessna dealer for a VPM (Value Per Mile) analysis. There's no obligation.

HOW MUCH EXTRA CO
ANCE CAN I EXPECT FR



...Twice as much, or more... aboard a new Cessna 310 F You'll recognize an unmistakable aura of command... an image of grace, power, and eagerness... a perfect compliment to your top-level travel plans... in the 310 F for '61. Built lithe and lean for aerodynamically clean performance, its slim lines conceal a big command post cabin... offering full stretch-out freedom to four or even five "size forty-plus" occupants... in five optional seating arrangements! With true twin-engine safety, speed, and performance, the 310 F challenges crowded calendars by providing a practical and proven travel plan for the man with more places to be— ever save tran com You

COMMAND PERFORM-
ROM A CESSNA 310F?

be — more people to see than commercial airlines, the automobile, or railroad can possibly permit. It's even faster than most airline schedules — and more direct! Equip your company with a 310 F and you can save half — or more — of every travel hour you and your key men are now spending on surface and public transportation. Half hours that add up to extra day-dividends . . . for extra travel, extra planning, extra command performance!

Your Cessna dealer has a listing of blue-chip travel securities. Time dividends guaranteed.

TOP OF THE MARK IN PRIDE, PRESTIGE INCOMPARABLE CESSNA COMFORTABILITY

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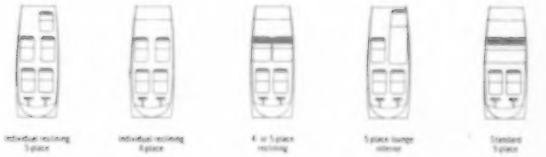
Excellence is a worthwhile dream . . . a dream realized in the spacious stateroom of the exciting 310 F for '61! As you look, feel . . . and enjoy the total experience of tasteful elegance aboard the world's best all 'round light, twin-engine executive aircraft, you'll sense the craftsmanship, the pride and the consummate skill employed in the selection and application of the materials which surround you. For these make a masterpiece. Step aboard and savor the subtle complements of color, of light, of texture, and tone. Tiny points of silver and gold mylar glitter amidst the weave of the richly textured wool carpeting . . . pointing up the burnished gold of the silken leathers artistically deployed on seat trim and bolsters. You'll enjoy, too, the quiet variations of tone on the "sun-sculptured" seating fabrics and the rich and restful effects of gold and silver threaded drapery and ceiling material caught in a background of fine basket-weave wool.

Throughout, you'll be pleasantly aware of the impeccable attention to detail . . . the soft polished sheen of metal fittings . . . the patient and precise hand stitching and assembly . . . the complete custom approach to the fashioning of a sophisticated environment for a **top man on the move!** As you travel you'll relax on super-soft cushioning . . . hand-formed over a basic seat construction designed to "back-up" hours and hours of continuous flight comfort! You'll have five distinctly different seating arrangement options . . . this year with new, individually adjustable seating features designed for greater individual comfort and freedom of adjustment!

All this* combined with whisper-quiet cabin sound control . . . Big, walk-in, walk-out cabin door; an all-weather, all-altitude "Blend-Temp" ventilating cooling and heating system; a "command console" instrument panel . . . and you have the top comfortability demanded for the best in command performance!

* Add, also, these incidental, but important, convenience items: Cigar lighter • ash receivers • optional drop-leaf, walnut writing desk • magazine racks • utility shelf • console and dome lights • and many others too numerous to mention!

Five versatile seating arrangements!



"Eyes-on-the-Road," flight command instrument console puts everything within easy sight and reach! . . . features new, three-position starter mag switch, wrap-around, non-glare windshield.

TAJ CEDAR

Extra high, wide, and handsome cabin door provides natural walk-in, walk-out entrance and access, features triple-safety locks and "flight-snug" sealing.

In travel there's an ever-present problem... where does **transportation** end... and **comfort, convenience, and fun** begin? Best answer to this, the dilemma in which many modern men on the move find themselves... lies somewhere along the complete line of Cessna's for '61... 12 great new opportunities to meet the demanding missions of today's highly competitive business world — and to enjoy relaxing time en route! Visit your Cessna dealer today, exercise your option to match the mission you have in mind with the world's most complete line of business aircraft for every performance level, every price range. Then sit back and enjoy the difference between work and pleasure as you travel! In brief, "What's your need... name your Cessna!"

150

172

SKYHAWK

175

SKYLARK

180

185

182

SKYLANE

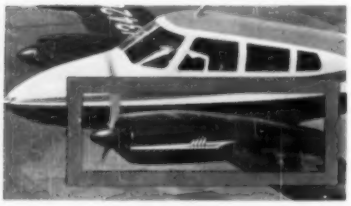
210

310F

SKYHOOK

CESSNAS FOR 61

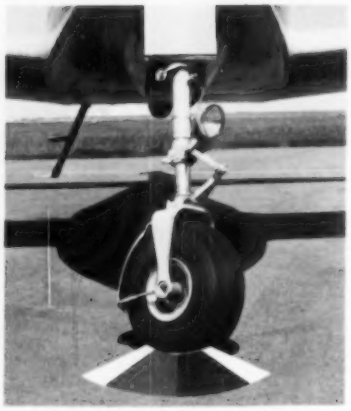
Two hundred pound baggage capacity of the 310 F provides full airline luggage weight allowance for each of five passengers. Spacious compartment accommodates full-size luggage — easily loaded from outside through an oversize door that automatically stays wide open when loading. Baggage compartment is fully lined of finest leathers to protect luggage from slightest mars or scratches.



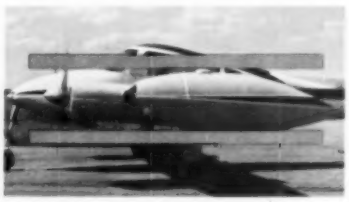
The flight/sweep nacelles of the 310 F are mounted parallel with the dihedral of the wing for minimum frontage to provide aerodynamic cleanness that minimizes drag, optimizes efficiency and speed, snugly houses the engines and directs cooling air-flow around cylinders in uniform and even patterns. Quick removable nacelle cowl and nose cap saves you time and expense during routine servicing.

A full set of airliner precision-type trim controls for rudder, and elevator, is located within easy reach of the pilot. The 310 F trims out beautifully for relaxed cruising flight — an important and valuable feature to the executive owner-pilot. Positive position indicators are built into each trim system for fast identification.

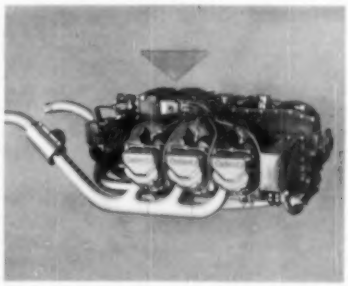
The Cessna 310 F pilot enjoys the pleasure and safety of wider panoramic visibility in all directions than that available in many larger airliners. Downslope taper of the nose also provides full vision ahead and to the sides in taxiing or parking. Passengers share the sweeping penthouse outlook in flight, enlarged for '61 by additional generous-sized rear windows.



Whether operating in and from the busiest metropolitan airports, or small out-of-the-beaten-path fields, nimble and precise ground handling is positive and time-conserving. The 310 F steerable nose wheel enables easy completion of sharp pivotal turns — Powerful taxi light automatically turns with the nose gear to show the way ahead during after-dark operation.

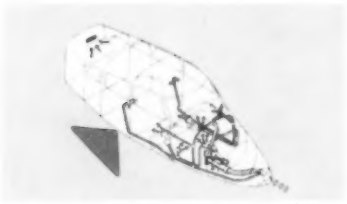


New for '61 is the Jet Age 310 F styling of the fuselage nose cap, "needle nose" propeller spinners and wing-tip fuel tanks. Sharper in appearance, they also afford an added margin of aerodynamic cleanness and efficiency. Location of fuel supply at wing tips affords an extra margin of safety; and tanks serve functionally to cause lift equivalent to 3½ added feet of wing area.



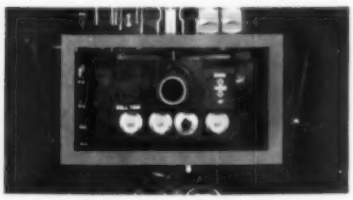
Either one of the new 310 F's 260-hp Continental IO-470-D six-cylinder engines can sustain the airplane in flight with full gross load at 8,400 feet absolute single-engine altitude; or with one engine inoperative, can climb at the rate of 440 feet per minute. These famous engines are now building new records for dependability and performance based on their multi-million miles of outstanding service. The "D" series for '61 in the 310 F, incorporates Scintilla retard-type impulse dual magnetos coupled with fuel injection that provide almost instantaneous starting. Their positive fuel-injection system, backstopped by intake air heating when required, eliminates even the remotest possibility of engine icing.

Quick-acting, split-type, dual-purpose, electrically operated flaps of extra large size boost lift and climb angle over obstacles; impose controlled drag for sharp, safe down-slant approaches into small-space landing areas. The use of these flaps gives the 310 F pilot a measure of maneuverability superior to that of many small, single-engine aircraft.



Heating and ventilation, more than adequate for a hotel suite, guarantees all-weather comfort to 310 F passengers from the new "Blend-Temp" fully controllable system. Alaskan owners enjoy Miami climate with heated fresh air from a 35,000-BTU gasoline heater. The system includes big-capacity windshield defroster, and a new on-the-ground warm air heat control. A ventilator exhausts stale air in flight.

All-weather, all-season utility of the 310 F is increased with optional installation of propeller anti-icing system, and wing and horizontal stabilizer de-icers. Fully service-proved, these systems provide extra margins of safety for flying through, rather than around weather that presents potential ice build-up in flight.



A compact, light-weight, full-maneuvering, and stabilizing automatic flight control system is available as optional equipment on the 310 F! Operating on all three axes — roll (aileron), pitch (elevator), and yaw (rudder), it will perform any safe maneuver in turbulent or still air — automatically and with unequalled precision. A single flick of the switch and your 310 F is under complete stabilized control, accurately held on any course you select.

CESSNA

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SPEED: BEST POWE
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IO-470-D Engines,
PROPELLER: Consta
WING SPAN
WING AREA
LENGTH
HEIGHT

NOTE: Single Engine
425 feet each 30

STAN

Altimeter, Sensitive
Ammeter
Arm Rests, (Six)
Ash Trays, (Four)
Attachment Provisions (C
Rings and Shoulder Ha
Batteries, (Two) 12 Volt
Brake, Parking
Brakes, Hydraulic Toe-Ope
Carpet, (Wall to Wall)
Circuit Breakers, Electric
Clock
Compass, Magnetic (Varia
Intensity Light Contro
Control, Fuel Strainer Dra
Control, Mixture
Curtains, Rear Window
Cushions, "Polycloud" Se
Defroster, Windshield
Detector, Navigation Ligh
Door, Baggage Compartm
Engine, Fuel Injection
Flaps, Wing (Electric)
Flasher Unit, Navigation L
Floorboards, Removable
Fuel System, Injection Ty
Fuel Tanks, Wing Tip
Fuel Valves, Quick Drain (
Gage, Fuel Pressure (Dual
Gage, Outside Air Temper
(Electric)

Standard equipment

RFORMANCE / SPECIFICATIONS

GHT	4,830 lbs.	4,500 lbs.	4,200 lbs.
ST POWER MIXTURE			
n – Sea Level	242 mph	243 mph	245 mph
n Recommended Cruise, 70% Power at 8,000 ft.	220 mph	222 mph	225 mph
RMAL LEAN MIXTURE			
n Recommended Cruise, 70% Power at 8,000 ft.	825 miles	840 miles	850 miles
ns, No Reserve	3.8 hours/218 mph	3.8 hours/221 mph	3.8 hours/224 mph
n Recommended Cruise, 70% Power at 8,000 ft.	1,070 miles	1,085 miles	1,100 miles
ns, No Reserve	4.9 hours/218 mph	4.9 hours/221 mph	4.9 hours/224 mph
n Range at 10,000 ft.	1,025 miles	1,070 miles	1,100 miles
ns, No Reserve	6.1 hours/167 mph	6.5 hours/164 mph	6.8 hours/161 mph
n Range at 10,000 ft.	1,340 miles	1,390 miles	1,440 miles
ns, No Reserve	8.0 hours/167 mph	8.5 hours/164 mph	8.9 hours/161 mph
IMB AT SEA LEVEL:			
ine	1,800 fpm	2,000 fpm	2,200 fpm
gine	440 fpm	525 fpm	615 fpm
ILING:			
ine	21,300 feet	22,500 feet	23,500 feet
gine	7,700 feet	9,200 feet	10,900 feet
un	800 feet	680 feet	590 feet
tance Over 50-Foot Obstacle	1,395 feet	1,250 feet	1,130 feet
Roll	620 feet	610 feet	575 feet
tance Over 50-Foot Obstacle	1,720 feet	1,690 feet	1,595 feet
IGHT (Approximate)	3,040 lbs.	3,040 lbs.	3,040 lbs.
	200 lbs.	200 lbs.	200 lbs.
NG: Pounds Per Square Foot	27.6 lbs.	25.7 lbs.	24.0 lbs.
DING: Pounds/HP	9.3 lbs.	8.6 lbs.	8.1 lbs.
CITY: Total	102 gals.	102 gals.	102 gals.
	133 gals.	133 gals.	133 gals.
TY: Total	6 gals.	6 gals.	6 gals.
Continental 6-Cylinder, Fuel Injection			
Engines, 260 Rated HP at 2,625 RPM			
Constant Speed, Full-Feathering			
	36 feet	36 feet	36 feet
	175 sq. ft.	175 sq. ft.	175 sq. ft.
	29.5 feet	29.5 feet	29.5 feet
	9.93 feet	9.93 feet	9.93 feet
	4,830 lbs. take-off allows for 5 people, full gas and oil load, plus 283 lbs. baggage and optional equipment.	4,500 lbs. take-off allows for 4 people, full gas and oil load, plus 123 lbs. baggage and optional equipment.	4,200 lbs. take-off allows for 2 people, full gas and oil load, plus 163 lbs. baggage and optional equipment.
Engine Service Ceiling increases over each 30 minutes of flight.			

NDARD EQUIPMENT

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r Temperature

Gage, Suction
Gage Units, Engine (Oil Temperature, Oil Pressure, and Cylinder Head Temperature Gages)
Gages, Manifold Pressure (Dual)
Generators, 25 Amp. 24 Volt
Gyros, Horizon and Directional New (One-Year Warranty — Includes Vacuum System)
Headphone Jacks
Heating System, Stall Warning Transmitter and Pitot
Heating System, Stewart-Warner Cabin (Thermostatically Controlled)
Heating System, Engine Induction
Hook, Clothes Hanger
Ignition System, Dual Operated
Indicator, Airspeed
Indicator, Fuel Quantity (Dual)
Indicator, Landing Gear Warning Audible
Indicator, Rate-of-Climb
Indicator, Stall Warning Audible
Indicator, Turn and Bank
Indicator, Wing Flaps Position
Instrument Panel, Shock-Mounted
Landing Gear, Retractable (Electrical with Auxiliary Manual Extension)
Light, Baggage Compartment
Light, Fuel Selector Handles (Variable Intensity)
Light, Landing (Retractable, Left Wing)
Light, Turn and Bank Indicator Test (With Dual Circuit for Heater Overheat Indicator)
Lighters, Cigarette (Front and Back)
Lights, Dome
Lights, Instrument Panel White and Red Flood (Variable Intensity)
Lights, Instrument Post-Type Red (3 Zones, Variable Intensity)
Lights, Landing Gear Position
Lights, Navigation
Lock, Baggage Door
Lock, Cabin Door
Lock, Aileron and Elevator Controls
Lock, Engine Controls Friction
Map Compartment
Microphone Jacks
Mufflers, Engine Exhaust
Nose Gear, Steerable
Oil Coolers, Non-Congealing
Paint Scheme, All-Over
Pockets, Map and Storage
Priming System, Engine
Propellers, Constant Speed Full-Feathering
Pumps, Engine-Driven Fuel (Two)
Pumps, Engine-Driven Vacuum (Two)
Pumps, Electric Auxiliary Fuel (Two)
Regulators, Voltage (25-Amp., 24-Volt)
Rings, Airplane Tie-Down
Seat, Rear (Adjustable Back)
Seat Springs, No-Sag
Seats, Adjustable Fore and Aft and Reclining Front
Shelf, Utility
Shielding, Engine Ignition
Sound Proofing (Super)
Space, Optional Instruments
Speaker, Cabin Radio
Spinners, Propeller
Starters, Engine (With Five-Position Rotary Switch)
Step, Retractable Cabin
Strainers, Fuel (With Quick Drain)
Straps, Assist
Straps, Baggage Tie-Down
Sun Visors
Tachometer, (Dual Electric)
Test Valve, Vacuum
Tow Bar, Airplane
Trim System, Aileron, Elevators, and Rudder
Vacuum System, Engine-Driven Pump Type (Dual)
Ventilators, Adjustable Cabin Air
Window, Pilot's Hinged
Windows, Double Rear
Windows, Tinted Side

ipment and specifications subject to change without notice

FREE VPM ANALYSIS — With the answers to six simple questions, your Cessna dealer can provide a Value Per Mile Analysis for your company. You can actually see **how little** it costs to travel farther and faster in your choice of 12 Cessna's for '61 and **how much** extra power, performance, and progress you can **expect and get.** Ask your Cessna Dealer for a free VPM Analysis, now. No obligation.

FINANCING — Your choice of 12 new Cessna's for '61 are as easy to **buy** as they are to fly! . . . for Cessna dealers offer a convenient, practical plan for financing . . . a program designed to provide fast, simple, pre-planned financing service. See your Cessna dealer for the details, and terms, of a financing plan which will put you out front, keep you out front — to stay . . . in a Cessna for '61. Lease plans are also available.

RENT-A-PLANE — If you want to test the profit-proven benefits of a Cessna before you buy . . . if you're looking for the link to make an important travel connection . . . or if you simply want to fly for fun . . . remember, you can rent a plane just like you rent a car! Fly yourself or with pilot provided. Call your Cessna dealer for complete details.

COOPERATIVE OWNERSHIP — If your individual needs do not presently justify sole ownership of the Cessna of your choice, ask your Cessna dealer about group ownership. He'll give you the full details of the popular associate plan for cooperative airplane ownership . . . a practical plan which permits small groups to pool their private air travel budgets in order to economically participate in the progress . . . and fun of flying a Cessna for '61!

LEARN TO FLY AS YOU TRAVEL — Your Cessna dealer has a flight training plan to fit your every-day schedule. Most popular is the "Learn-to-fly-as-you-travel" plan. You can actually take "on-the-job" flight training during business trips! Your Cessna dealer can also arrange an "after-five" and weekend schedule of training, too. And when you solo, your Cessna dealer will present you with a "Cessna Solo Trophy," a clever and handsome piece you'll be proud to put on permanent display in your trophy case, at home or in the office!

"GOLDEN RULE" WORLD-WIDE SALES AND SERVICE — Wherever you go you'll be only minutes away from the Cessna "Golden Rule" service. When you see the Cessna dealer's red and blue pennant shield of service . . . it's a sure sign that your service needs will be handled expertly, economically, and efficiently by factory-trained service technicians — and that you'll get prompt, courteous attention. Across the nation . . . around the world . . . look for the red and blue pennants, the sign of Cessna Golden Rule Service!

FLIGHT/SWEEP STYLED COLOR SELECTIONS

6: PATINA IVORY
VERDE GREEN
HARVEST TAN

3: PATINA IVORY
SUNSET ORANGE
COPPER-GLO BROWN

2: PATINA IVORY
MATADOR RED
SANDSTONE BEIGE

7: PATINA IVORY
SATIN GRAY
SUNBEAM YELLOW

1: PATINA IVORY
COPPER-GLO BROWN
HARVEST TAN

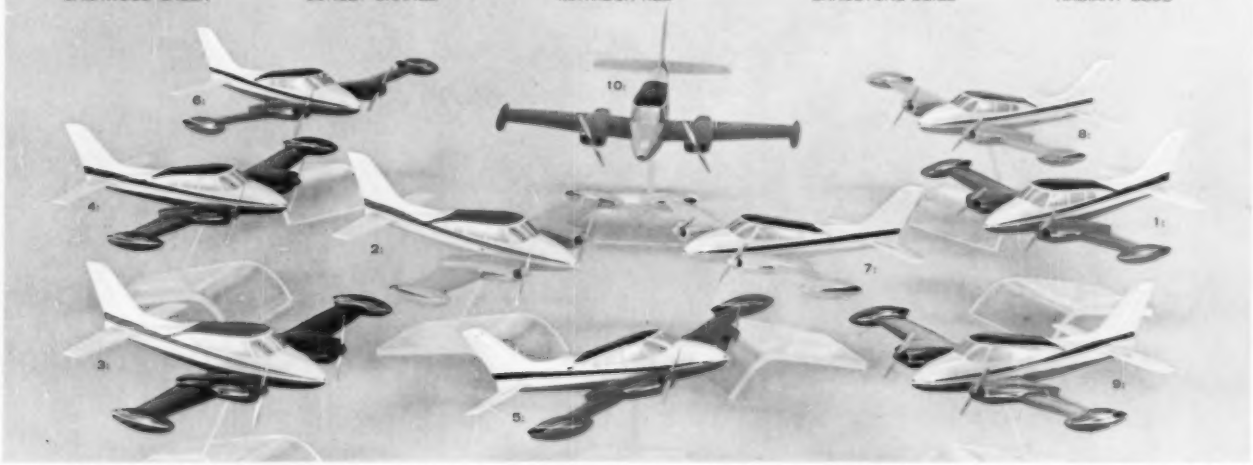
4: PATINA IVORY
VERDE GREEN
SHERWOOD GREEN

10: SANDSTONE BEIGE
COPPER-GLO BROWN
SUNSET ORANGE

5: PATINA IVORY
SATIN GRAY
MATADOR RED

8: PATINA IVORY
RADIANT BLUE
SANDSTONE BEIGE

9: FROST BLUE
TWILIGHT BLUE
RADIANT BLUE



WHATEVER YOUR TRAVEL NEED...SEE YOUR CESSNA DEALER TODAY

Cessna®
AIRCRAFT COMPANY
WICHITA / KANSAS

LITHO IN U. S. A.

HAVE YOU READ?

By JAMES F. SUNDERMAN

THE MANNED MISSILE: THE STORY OF THE B-70, by Ed Rees (Duell, Sloan and Pearce, 124 E. 30th St., New York 16, N. Y., $3.50).

The next great milestone in aviation will place man on the threshold of space. The vehicle to do it is the highly-controversial mach-3, B-70 "Valkyrie" bomber—a 2,000 mph missile-like delta-wing colossus that will operate between 80,000 and 120,000 feet altitude and withstand aerodynamic heating of 550 degrees.

Victim of a budget pruning exercise in early 1960, full official go-ahead and funds for development have just recently been restored, and it is programmed to fly by 1962.

Here is truly the first of a new generation, a radical design concept, an engineering departure. Already invested has been $400 million dollars, 6,215,000 engineering man-hours and 9,200 hours of wind tunnel testing. Many scientific breakthroughs make this craft possible.

Ed Rees, Time Magazine's senior military correspondent, dips into his broad knowledge of the B-70's political intricacies, of its engineering detail and operational potentialities and the meaning it holds for the United States in the years ahead. His readable report gives an account of national pride and accomplishment in the air that layman and professional flyer alike will not want to miss.

ALWAYS ANOTHER DAWN: THE STORY OF A ROCKET TEST PILOT, by A. Scott Crossfield with Clay Blair Jr. (World Publishing Co., 2231 W. 110th St., Cleveland 2, Ohio, $4.95).

The collaboration of two top professionals makes this a vivid, engrossing story of high speed, high altitude jet and rocket plane research, development and flight test. Blair, "Saturday Evening Post" editor, has been writing about aviation for many years. Scott Crossfield, North American jet and rocket aircraft test pilot, has been exploring the aerodynamic frontiers even longer; and it is his story, from youth through the X-15 flights, which Blair's magic touch unfolds in readable and timely prose.

While the book focuses on Crossfield's association with the X-15, it traces his entrance into the test pilot business via service as a Navy flyer. Early duty with NACA gave him the chance to fly the X-1 and he was first to fly at twice the speed of sound. Other NACA craft he flew included the Douglas Skyrocket, the X-4 and X-5. He joined North American to get a crack at the X-15, and the warm, first-person account of this phase of his career is written without the sensational style normally used by writers. In a factual, carefully documented account the reader gets an inside glimpse of the man, the machine and the program which will advance flight into space.

The Crossfield saga is a modern pioneer adventure for young and old alike. Pilots of all grades may gain valuable flight tips from this careful, calculating, steel-nerved, matter-of-fact professional airman. They will certainly find clear understanding of the technology and the art underlying man's first great step beyond the atmosphere.

FLIGHT FACTS FOR PRIVATE PILOTS, by Mr. Merrill E. Tower (Aero Publishers, 2162 Sunset Blvd., Los Angeles 26, Calif., hardcover $5, paperback $3.50).

This new illustrated aeronautical handbook is specifically designed for student and private flyers treating all fundamentals of piloting technique and knowledge required for FAA licensing. It deals with all ground and air subjects from theory of flight to attitude instrument flying. For a clear, concise, easy-to-understand ground school text, it is hard to beat.

THE MAN WHO RODE THE THUNDER, by Lt. Col. William H. Rankin, USMC (Prentice Hall, Englewood Cliffs, N. J., $3.95).

It was on July 26, 1959 cross-country flight that veteran Marine pilot Bill Rankin, cruising at high altitude above Southern Virginia in a Marine jet F8U-2, suddenly saw the red blinking fire-warning light—signal for instant bail-out. Rankin blasted himself through a jammed canopy into space.

Forty minutes later he touched the ground. In that time he lived through a series of phenomenal experiences which even now puzzle meteorologists, aeromedical specialists, pilots and engineers.

First there was explosive decompression at an altitude thought fatal, especially without a pressure suit. Rankin wore none, and his body swelled to horrible proportions. Second, the temperature was 70 below zero and Rankin wore no special protective clothing. He wisely free-fell seven miles to reduce frostbite. Then, he descended into the heart of one of the worst thunderstorms to hit the Virginia-North Carolina area. For 40 minutes Rankin and his parachute were subjected to violent, crushing winds which jerked him hundreds of feet in all directions. Torrential rain and hail pelted him.

The tough Marine survived, and he prefaces this modern air age adventure with a brief glimpse into his career in WW II, his combat record in Korea as one of the "Fearless Four" Marine pilots (who bombed the Bridges at Toko-Ri) and his duty as commander of Marine Jet Squadron 122.

Rankin wisely refrains from the dazzling and sensational. He writes in solid professional style that will interest flyers and non-flyers alike.

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Acceptance of the new Lake LA-4 more than one year ahead of schedule

John F. Strayer reports to you on America's "jeep of the air"

In sixteen short months the new Lake LA-4 has achieved a degree of acceptance which we did not expect to reach in less than three years. Your recognition of the plane's dependability and its special (and highly useful) character provides a happy basis on which to look ahead to a new year of production. All America — both North and South — has said it likes this plane. And, as the saying goes, you are putting your money where your mouth is. Our backlog of verified orders will continue to fully test the capacity of Lake's modern and efficient production line.

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The Lake 4-place amphibian neither looks nor flies like any other plane you ever tried before. To the extent that it is made to take off and land on either land or water it is, of course, an amphibian. In fact, it's the only single-engined amphibian made in the world today. Beyond this comparison stops.

Lake has the agility, the short take-off and sharp rate of climb most land planes can envy. It glides like a glider. Because of low stalling speed, it can almost "hover." It comes in for a short safe landing, on wide landing gear or true boat hull, to make it *the plane* to take you in and out of more places for your business or pleasure than any land *or* water plane can do. Because of its useful load capacity (four big men or equivalent), we've called Lake the workhorse of the air. Its willing response and go-anywhere dependability lead others to call it America's flying "jeep". You take your choice. It's what the plane can *do* that counts.

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No other type of aircraft can take its place in ability to *pinpoint destination* . . . to bring men and materials down on land or water wherever they want to go or may be needed and bring them out again, regardless of airport facilities.

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By your open-minded interest in this single-engined amphibian, and by your orders, you are solidly underwriting the good future of this new and exciting entry in America's aviation field, already proven in rugged service around half the world. I would like, personally, to thank each and every one of you. We at Lake invite you to view Lake's production line and eye-witness the meticulous care with which each plane is built.

In the meantime I hope that you will write me personally for complete Lake specifications, and the name of your nearest Lake Dealer. There are more and more of them each week; they, like you, see new and profitable horizons for aviation in this new plane.

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John F. Strayer
President

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STANDARD OIL COMPANY OF CALIFORNIA

Reformation for the Grass Roots

GILL ROBB WILSON
Publisher

RECENTLY I saw an old Soviet airshow program across which was scrawled, "Fly higher, faster, farther than any one else." Signed: Joseph Stalin.

There, in cryptic admonition is the taproot of Red airpower—summit interest in grass roots programing.

And who will deny that Soviet planting of arts and motivation in millions of eager youth has not brought an abundant harvest to Communism.

This breadth and depth of seeding is in the ultimate more meaningful than current triumphs in experimental science. Nuclear missiles have their place in the desperation of freedom, but be warned—they are not airpower. Airpower is a living thing of many facets and mobilities. Missile power has one facet—the retaliation of annihilation. And if, God grant, they decay in their cradles, what then of a nation which has no great sinews in its sky?

Presently, American grass roots programing is the most colorless segment of our aviation spectrum. Here, where our future is in incubation, the fire has died out. By what reasoning?

Can there be harvest without planting? Does the bent twig no longer incline the bough? Is freedom disdainful of motivation? Is our air industry saturated with skills and our commerce with passengers? Do our rural communities hold their young people? Will our multiplying millions multiply in stature without expanded opportunity for zestful self-expression?

During the Presidential campaign we heard much of expanded opportunity for the citizen—of frontiers for self-expression—of leadership for living.

Well, here is an area which needs it, and the time is psychologically right. The key is intelligent interest at the summit. FAA Administrator Quesada had made up his mind to that effect and had action on his schedule. In the Congress are grass rooters of imposing stature, such as Mike Monroney and Barry Goldwater, who understand the nature of airpower. They know American communities are isolated from the air age—that the "pursuit of happiness" is poor hunting in our skies. An Administration which interested itself in grass roots programing would have no dearth of wise counsellors. Nor is this a matter of subsidy. The subsidy we need is leadership, vision, enthusiasm in high places.

Reformation to contrive grass roots programing probably should start with a section in FAA organized for that purpose.

There are certain inequities to be corrected—some by legislation, some by regulation. There are certain services to be instituted and others to be improved. A section in FAA devoted to these and kindred matters would keep government in touch with the grass roots.

But beyond this there are matters in which the influence of even the White House could constructively be exercised.

Flight strip development could be integrated with the national road building program and hundreds of communities thus be served.

A volunteer flying corps could be established in the National Red Cross and trained in local disaster relief, search and rescue, and from a long range viewpoint, for service to civil defense in time of war.

Encouragement of sports flying with local, national and international competition would be helpful. Club activity, including soaring and parachute jumping, would bring opportunity for mild adventure to many thousands if the FAA set its mind to such a program.

The Civil Air Patrol could be transformed into a service-wide youth program for ground school and soaring training. Thereby the Defense Department could achieve both motivation and skills which would save millions in selection and training of eventual recruits.

There is no end to what a little creative imagination might accomplish in grass roots programing.

But, we reiterate, the key is the interest of top leadership. When somebody at summit level in the United States autographs an admonition to the American grass roots to "Fly higher, faster and further than anybody else," and sees that the opportunity is provided, a lot of us will feel better about the future of our children.

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Your passenger service reflects outstanding selection of personnel. The neat and efficient young ladies in front of the counters are a credit to a company who cares about the customer.
M. J. McDonough

UNSOLICITED IN-FLIGHT LETTER FROM M. J. MC DONOUGH, EQUIPMENT SALES DIVISION, AMERICAN CAR CO.

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AMERICAN AIRLINES
America's Leading Airline

A new concept of nuclear warfare may spare cities for military targets.

By LT. COL. D. F. MARTIN, USAF
Office of the Deputy Chief of Staff, Plans

B-70
Artist's conception

B-58

Will aircraft or missiles win wars?

FIVE, FOUR, THREE, TWO, ONE, FIRE! The tremendous energy released by giant rocket engines perhaps can be felt much better than it can be heard. The pulsating vibration of energy clutches at the pit of your stomach.

Never before has the introduction of a weapon caused so much apprehension and fear. Nuclear weapons are fearsome, but the long-range ballistic missile gives them a stealth and merciless swiftness which is much more terrifying.

A great many writers are bewitched by the apparently overwhelming advantage an attacker would have if he were to strike with complete surprise using nuclear rockets. It is relatively easy to go a step further and reason that an attacker, in possession of such absolute power, would simultaneously destroy his opponent's cities and people. With a nation defenseless before it,

why would the attacker spare the victim's people? Wouldn't the wanton destruction of cities and people be the logical act of complete subjugation? The nation would be utterly devastated. The will of its people, so crucial in time of peril, would be broken.

Nuclear weapons have given the world the means for self-destruction in hours or days; and now rockets have given it the means to destroy itself in minutes. At this point it should be painfully obvious that cities, being "soft," and the people within them are ideally suited to destruction by nuclear weapons.

However, because this vulnerability is mutual, it is to the advantage of neither side to destroy the opponent's cities, at least so long as the opponent has nuclear weapons with which to effect reprisal. It should be appallingly apparent that city-trading is not a profitable military tactic.

ICBMs had given us a capability which could be used in two different ways. They could be used to attack a nation's people (which would inevitably mean the loss of the attacker's own people), or they could be used with discrimination to destroy the enemy's military force.

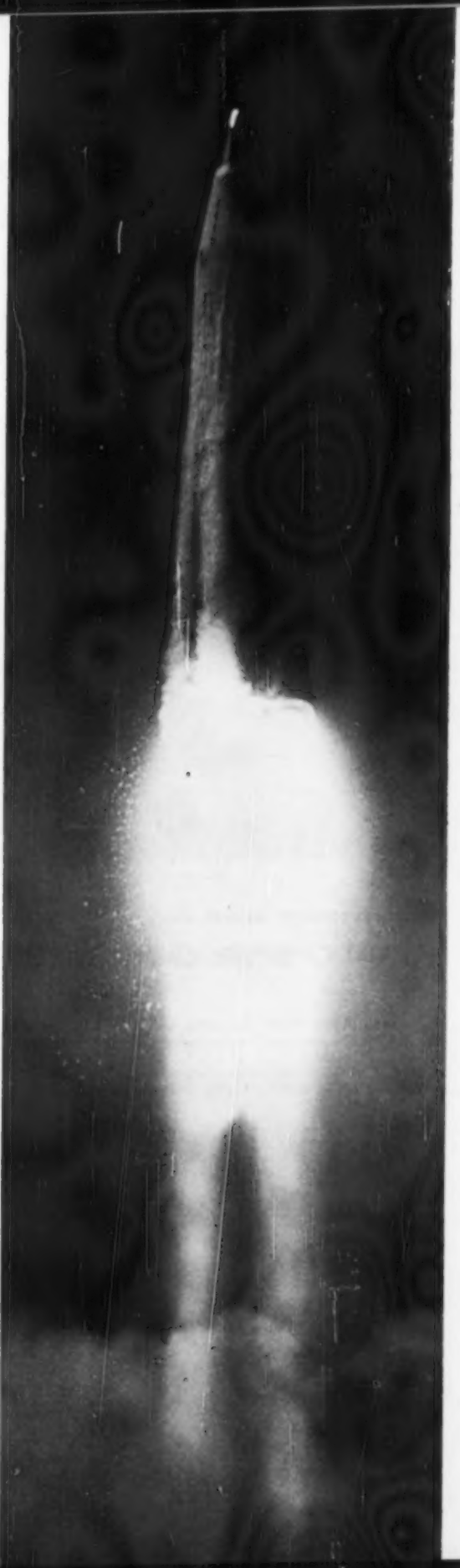
If our national interest lies in being able to fight and win a war rather than committing national suicide, then we must take a much more penetrating look at ballistic missiles. We must determine whether missiles can win a war all by themselves. We must make certain that the aircraft is finished before we give the entire job to the missile.

B-52G

Missiles are very valuable weapons, but they also have their too little known limitations.

Because of a missile's ballistic trajectory, the location of a fixed target must be known quite accurately. Placing missiles in submarines, on barges, railroads, highways, surface vessels and in the air provides them with passive protection by taking advantage of the gravest weakness of long-range ballistic missiles today—the extreme difficulty of destroying a mobile or moving target with such weapons. One must first *detect* a fleeting mobile or moving target, *decide* that it is worthy of destruction, *select* the missile to be fired against the target, *compute* ballistics for the flight, and *prepare* the missile for firing.

Even if all these operations could be performed *instantaneously*, the ICBM still has a time of flight to the target of about 30 minutes. (*Continued on page* 80)



Atlas ICBM

PILOT REPORT

Twin-turbine reliability and high speed are incorporated in this new amphibian, designed as both submarine hunter-killer and 25- to 28-passenger airline carrier.

By A. C. BASS

FIRST FLIGHT EVALUATION of Sikorsky's twin-turbine powered amphibious helicopter—the Navy HSS-2—designed from scratch as an anti-submarine weapon system—pointed up this rotorcraft's marked hands-off performance, unique interlinked control system, single-engine capability and speeds up to 140 knots.

The commercial airline derivative of the fast HSS-2 (Navy pilots have flown the helicopter at indicated speeds up to 162 knots at 6,000 feet)—the 25-28 passenger S-61—will be delivered to Chicago Helicopter Airways and Los Angeles Airways beginning the second half of 1961, following FAA certification.

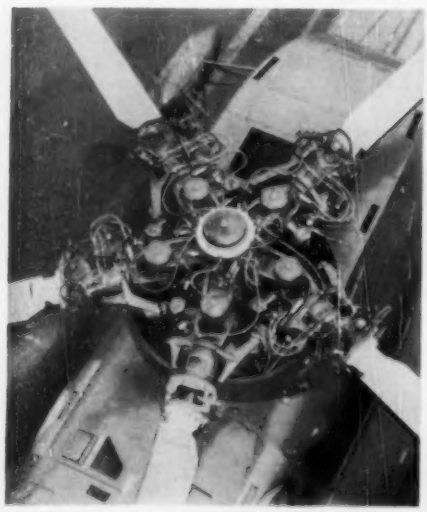
Evaluated by Flying at the Stratford, Conn., plant of Sikorsky Aircraft, the versatile HSS-2 was produced and first flown (in 1959) only 15 months after the initial contract was signed. It is designed to detect,

The military version, with retractable landing gear, has a full four-hour anti-submarine patrol capability and can carry nuclear depth bombs.

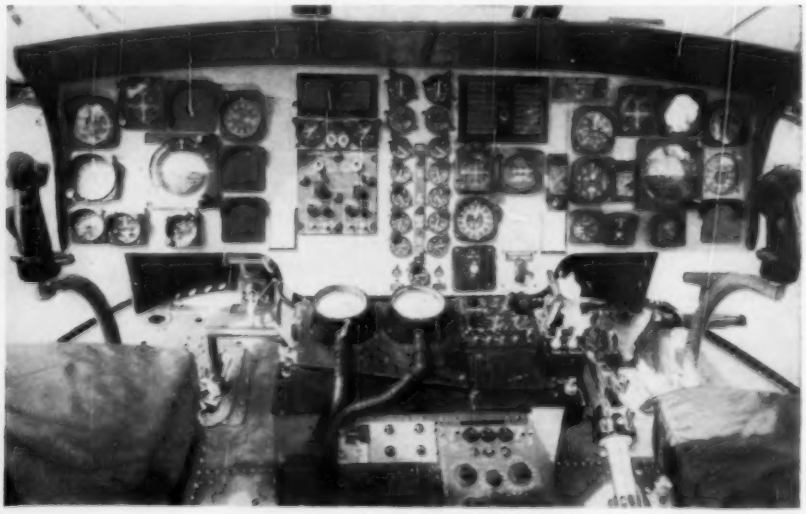
SIKORSKY HSS-2—

FROM WEAPON SYSTEM TO

Rotor head of the HSS-2. The cables are part of the fully automatic rotor blade folding system.



Cockpit and instrument panel of the HSS-2. Instrumentation allows all-weather operation. Automatic stabilization equipment and a pitch-to-yaw coupling simplify flight control.



identify, track and destroy enemy submarines in a single operation. It will be delivered to the fleet this year, a little over three years from contract initiation.

Of the commercial S-61—with its inherited speed and military ruggedness—four will go to Chicago (which has an option on two more) and five are earmarked for Los Angeles. Sikorsky Aircraft Div. of United Aircraft Corp. also is negotiating with other airlines for additional sales.

Aircraft flown was powered by twin General Electric T58-6 turbines delivering up to 1,050 shp each; engine dry weight is 270 pounds. With a power-to-weight ratio of four-to-one, these turbines give the HSS-2 a guaranteed forward speed of 135 knots and an allowable gross weight of 16,250 pounds. The S-61 with the -6 engine has an allowable gross weight of 15,800 pounds. New models of the HSS-2 and S-61 will be fitted with larger General Electric T58-8 turbines (deliveries began in December) with ratings of 1,250 shp maximum and 1,050 shp continuous power; engine weight is 275 pounds.

Guaranteed airspeed is 130 knots, with an increase in allowable gross weight to 17,300 pounds (the HSS-2) and 18,700 pounds (S-61). Single-engine performance also will increase.

Design features and performance characteristics applicable to either or both rotorcraft include:

• With its boat hull and retractable gear the HSS-2—in the weight class of a medium transport helicopter—meets Navy requirements for both land and shipboard operations. It is capable of single-engine operation at gross weight. Gear retractability will not be built into the S-61.

• With a payload of approximately four tons, and priced at $640,000 complete with custom interior and communications equipment, this S-61 represents a major breakthrough in lowering the seat cost per mile from the present-day 14-17 cents to a more adequate eight to nine cents.

• Test and development programs have accumulated more than 1,300 flight hours on the HSS-2, much of which has been accumulated at both the Stratford, Conn. plant and the Naval Air Test Center at Patuxent River, Md. Most helicopter components have been substantiated in excess of 1,000 hours between overhauls.

• Military version has completed cold weather testing at Eglin AFB, Fla., and has demonstrated—at the Naval Air Torpedo Test Unit, Quonset, R. I.—all required weapon delivery capabilities (nuclear depth bomb and conventional warfare). It will be fitted with four torpedo racks. A full four-hour anti-submarine patrol, the design mission, has been flown repeatedly.

• Additional advantages of the twin-turbine helicopter include constant-speed automatic control, single-engine climb capability, quick-removal and lightweight turbine installation. Automatic stabilization equipment (ASE), part of the military package, will not be necessary to all-weather operation of the S-61 in scheduled airline service.

The sophisticated HSS-2, the second Sikorsky helicopter built with a boat hull (the first was the single-turbine S-62 now flying with Los Angeles Airways), embraces fully automatic blade folding. The tail folds forward on the right side, stabilizer cocking over the fuselage. The helicopter itself is basically aluminum with few applications of steel and titanium. Glass fiber is liberally used on non-structural fairings and doors.

The HSS-2's five-bladed main rotor is 62 feet in diameter and the tail rotor, also of five blades, has a diameter of 10 feet. The rotor hub is all-steel and the rotor head system uses pre-loaded bearings for positive control. The all-metal blades (*Continued on page 72*)

S-61, the commercial derivative, has a payload of approximately four tons and will cut the present-day seat cost per mile almost in half.

COMMERCIAL AIR TRANSPORT

PART II

A seeming gravitational contradiction regarded as a scientific curiosity—the gyroscope—is transformed into a major tool for navigation and stabilization.

SPERRY

INDUSTRIAL GIANT OF THE AIR AGE

By GILL ROBB WILSON

Left: At 50 Elmer Sperry founded the Sperry Gyroscope Co. *Center:* With Hannibal Ford, right, and captain of the steamship Princess Anne, Sperry sees preparation of his gyro-compass for its first sea trial. *Right:* Gyropilot with which son Lawrence Sperry won Grand Prix at Paris in 1914.

OUR FIRST ARTICLE on the Sperry Rand Corporation was devoted to Elmer Sperry in the peerage of America's most useful sons; and his stature as an inventor, engineer and scientist. The time span was the last third of the 19th century, an era notable for its creative productivity. Historians then estimated their century as an industrial plateau assuring national prestige for generations. The gay nineties were a manifest expression of exuberance.

They had justification—the steel plows of John Deere, the harvesters of Cyrus McCormick, the threshers of the Pitts brothers, the typewriter of Sholes and Glidden, the suspension bridges of John Roebling, the cash register of John Ritty, the telegraph of Samuel Morse, the telephone of Alexander Graham Bell—to cite examples. Steam and electricity had been put to work. The gas engine was pumping oil. The Bessemer process was producing steel.

The impact of all this on a society long dependent on human muscle and animal docility was exhilarating. It could scarce imagine that a still unexpended momentum lay behind the advent of western civilization.

But the pace did not falter. Marconi hailed the birth of the 20th century with wireless; the Wrights with wings; Ford with a "people's" automobile; Sir John Fleming and Lee De Forest with the electron in harness; Edison with the talking machine.

Elmer Sperry had been a brilliant genius of the 19th century. With hundreds of patents to his name he might have chosen to relax. That at the age of 50 he disdained security for opportunity and elected to iden-

tify himself with the future is the mark of the man. Although his ingenuity had built many great enterprises, he cared so little for what was past that not one 19th century corporation bore his name.

In 1905, Sperry moved from Cleveland to the suburban village of Flatbush, N. Y., to be near chemical projects upon which he was working for American Can. Thus it was that the industrial giant of the air age which would bear his name—the Sperry Gyroscope Company—came to be established on Long Island.

Jean Bernard Leon Foucault, the great French physicist, died in 1868, only eight years after Elmer Sperry was born. Foucault had discovered a method to measure the speed of light and thereby open the door to a treasure of fresh knowledge. More pertinent to our story, however, Foucault also contrived around 1850 a mechanism illustrating how and why our planet moving in space and in continuous rotation pointed always with its axis to the North Star. This mechanism he called a gyroscope, borrowing a term from the Greek which literally translated means, "to view the earth's rotation."

No significant use was then or soon thereafter found for the gyroscope principle. Sperry had long been acquainted with it through scientific magazines and patent studies and confessed that the oriental spinning tops and diabolos with which the children played intrigued him also. Perhaps from the toys he came to realize that the gyroscope was not the gravitational contradiction it seemed. In any case, it was not until he already was in middle age that he gave serious consideration to harnessing the gyro. And then it was not because of scientific curiosity but that he saw a need for stabilization in the unstable vehicles which had come into vogue—the steamship, the automobile, the airplane.

We previously mentioned "the ability to see a need" as a common characteristic of great inventors. We must note another common trait. Without exception, all were avid students of patent claims. I first noticed this when employed as an aviation consultant to Vincent Bendix. Originally, I presumed that "VB" was unique in his seemingly inexhaustible knowledge of existing patents but gradually, listening to his conversations with Walter Chrysler, Charles Kettering, William Knudsen, Herbert Sharlock and others, I found that all shared a remarkable insight into patent claims. They would discuss mergers or purchase of companies to acquire some patent because they had an idea of how to improve it and generate thereby a greater market.

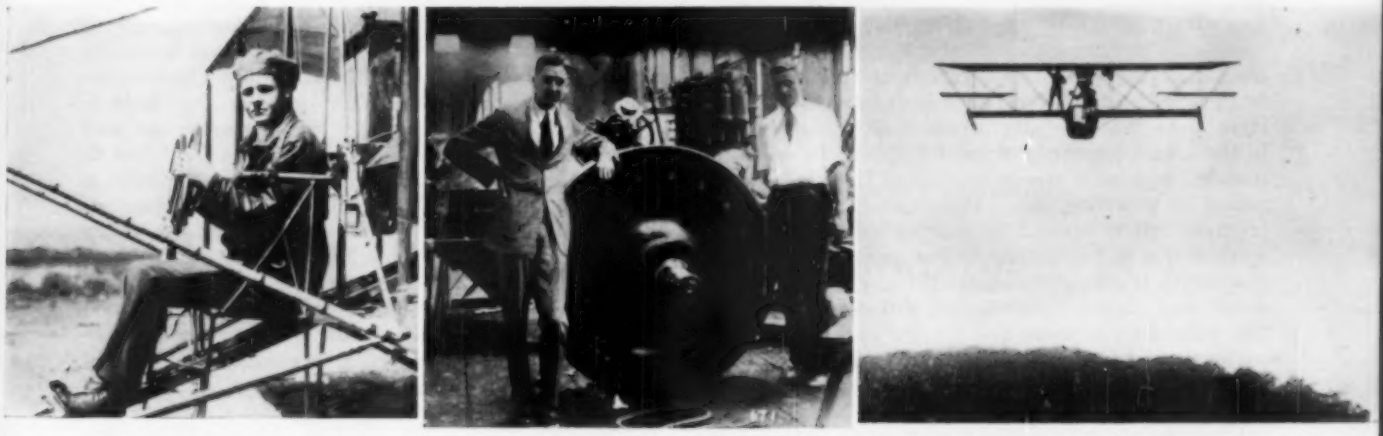
It was not surprising to learn then that Elmer Sperry had no peer as a patent researcher and claims writer. This study must have enriched his mind in an extraordinary degree. He was one of the few men of his day who dared dream that he could devise the mechanisms to put the gyroscope to work.

The idea of thus attaining stabilization seems to have occurred to Sperry in connection with his electric automobile in Cleveland. All horseless carriages were tipsy—big wheels, high center of gravity, "ejection seat" springs, short coupling and kindred inadequate engineering considerations. I recall overturning my first car by merely clipping the curb on rounding a corner. Thereafter, I clamped an old anvil on the rear axle. It was a thing of jeopardy on a crowned dirt road, but it had its points otherwise.

For the record, Sperry's first utilization of the gyro in stability was on the destroyer, USS Worden. Navy's alertness to the potential of the idea was to bear rich dividends eventually in a great many directions.

Even more important to mariners, however, than stabilization, was some fresh concept of navigation. The magnetic compass had become compromised in dependability as wooden hulls gave way to steel and sail to steam. Each time the long rifles of a man o' war swung on target the compass would swing with them. Each time a merchantman was loaded or unloaded the ship's compass was affected. Here was a critical impasse in sea power—in ocean commerce. Sperry envisioned that the gyro, continuously driven by electric motor, sensing the earth's rotation, and pointing always true north, could be the answer.

How logical and practical it all seems now. But it did not seem logical back there. Having sunk his teeth into the conviction that he had something, Sperry was



Left: Lawrence Sperry in a Curtiss exhibition aircraft. *Center:* Engineers Robert Lea, left, and Edward Sperry with Sperry yacht stabilizer rotor. *Right:* Flying hands-off with mechanic on the wing, Lawrence Sperry wins French War Dept. safety contest at Paris with gyro-stabilizer in control.

unable to recruit risk capital. That probably was a stroke of good fortune unappreciated at the time. The engineer was not deterred. In 1910 with his own financing he founded the Sperry Gyroscope Company—an office and shop in rented quarters, and a payroll of minuscule proportions. One self-evident stroke of fortune he did have. The previous year he had persuaded an Underwood Typewriter engineer, Hannibal C. Ford, to join him. Ford was a Cortland boy and a Cornell graduate—a product of the same influences as Sperry himself, and already a notable designer.

It should be noted here that at that period of his life Sperry's success was not in terms of wealth. He supported his family on his salary when he had one, and on consulting fees from the companies with which he was connected. It must be remembered that in those days when a company was sold, the sums involved were very modest as there was no accompanying ballyhoo to launch the stock with glittering promises, as is the case today. The money to pay Hannibal Ford's salary and get the Gyroscope Company going came from the sale of Sperry's Electric Railway Company.

It is no part of our story to lead the reader through a technical description of gyro operation or to trace its evolutionary applications.

BUT this we must point out—Sperry's research with the gyro authored not only the vast diversity of the industrial giant to bear his name, but an incalculable new range of 20th century progress. Here was born the concept of precision instruments. Here blossomed the potential of servo-mechanisms. Here originated the facility of electrical data transmission. Here arose the ingenuity of mechanical computation. In the future, hundreds of great corporations would be founded to pursue one or another of the phases originating or flowering here. Prospecting for nuggets of progress, Sperry opened the mother lode whose development was to revolutionize transportation, to shrink geography, to magnify science. If today we shoot at the moon, hurl rockets between the continents, orbit scientific watchdogs in space and survive as a free people—we must not forget a humble and dedicated man whose courage and faith were the bright beginnings.

Originally, as a part of this story we had yielded to the temptation to describe how Sperry contrived his frictionless bearings for the heavy gyro, to follow his ingenuity in achieving remote readings of the master compass, to trace how Navy was given a system of modern fire control, Army its anti-aircraft defenses and many other evolutionary adaptations which emerged.

Over all this and more we labored long and lovingly and then discarded the whole in deference to the reader's patience. Only the historic significance of it all we have retained and set down, to, we hope, the reader's appreciation of Elmer Sperry's usefulness.

We would not contend that Sperry foresaw the limitless industrial enterprise which would blossom from his labors any more than he could know that Sperry Gyroscope would be the first of a following multitude of companies to originate in answer to a national need; and in the case of Sperry, to continue in that role without interruption for a half century following.

But this he did say to the Society of Naval Architects in 1908, "I should not be surprised if this instrument (the gyroscope), which has for centuries been a scientific toy and a plaything of mathematicians, were to become one of the most useful tools in the arts and industries. Not only, I predict, will it guide our ships, but it will also have other and far-reaching uses."

Just two years later, Sperry and Ford installed the first gyro compass on the USS Delaware, aided by two youthful shipmates of the Delaware, each of whom was ultimately to serve as President of Sperry—Thomas A. Morgan and R. E. Gilmor.

And now we must turn back to pick up another thread for the warp and woof of our story.

At the age of 27, Sperry had married Miss Zula Goodman, a remarkably talented daughter of a distinguished Chicago family. It would be impossible to exaggerate the part she played in her husband's career. One might say she created the climate in which Sperry's genius could increasingly thrive.

The couple had four children, Helen (who became Mrs. Robert Lea), Edward, Lawrence and Elmer Jr., the first three born in Chicago and the latter in Cleveland. As the children grew toward maturity, the family became a closely knit sextet—impressively so. Wife and children were taken into father Sperry's mind as well as his heart. Whether heredity or environment played the greater part, who can say? But without exception the children were at home in the world of their father's creative imagination.

At the time Sperry founded the Sperry Gyroscope Company, Edward was heading for an engineering education at Cornell; Lawrence, then 14, was becoming a capitalist in his own right by operating a bicycle repair shop (shades of the Wright brothers) for Flatbush boys; and Elmer, 13, was the maintenance man and chauffeur of the family automobile, one of the first in Flatbush. This function brought Elmer in intimate touch with the gyro as he ferried his father to appointments and lectures and assumed the role of guinea pig in demonstrations and experiments.

Inevitably, Lawrence attached a little single-cylinder engine to his bicycle and now he had a motorcycle and became a dirt road cross country tourist. More importantly, he began his education in engines.

So it came about that he was on hand one mid-summer morning of 1908, at Brighton Beach Race Track, to see Henri Farman make the first aircraft flight in the Metropolitan area.

THAT did it! The bicycle repair business became an aircraft design shop. Lawrence had to fly! There weren't a dozen aircraft designers in America then, so naturally he had to design and build a plane before he had anything to pilot. When the family left for vacation the following summer, the 16-year-old Lawrence turned the Flatbush home into an aircraft factory and by the time they returned he had built his glider. The place was a wreck and the family almost had to tear the house down to get the wings and fuselage out of the living room and bed rooms. But they made it and now Lawrence drafted Elmer on scores of mornings thereafter to tow him around the race track with the family car while he learned to maneuver the machine before installation of an engine. All usually went well, but one morning the rope broke in takeoff, the glider whipped into a (*Continued on page* 76)

Large slotted flaps and full span leading edge slats permit steep angle of climb after takeoff run less than 200 ft.

Working from small "helio pads," this versatile aircraft is capable of inter-plant and other special operations.

HELIO COURIER—Prescription for STOL

By GERALD J. SCHLAEGER

LAGUARDIA TOWER, Helio 4162 Delta requests clearance to the Helio pad for takeoff." This Request, emanating from the trim blue, silver and orange day-glow Helio Courier in the Marine Air Terminal area of LaGuardia Airport, might have caused confusion at many airports, but not here. The tower's answer was immediate.

"Helio 4162 Delta is cleared to the helio pad. Call when ready for takeoff." This helio pad is a 400-foot-square plot on the airport proper marked and set aside for STOL (step takeoff and land) aircraft. It is an airport within an airport, complete even to its own traffic pattern. The STOL, like the helicopter, is a nonconformist to conventional aircraft traffic patterns; it would lose much of its versatility if forced to conform.

An experiment is in progress in the New York City area to determine the feasibility of using the STOL for inter-airport passenger transportation. Cost analysis indicates that the STOL may be operated for approximately one-third the cost of helicopters in similar service. Helio looks to the inter-plant and plant-to-airport transportation as well.

It is difficult to visualize a 3,000-pound airplane operating regularly from a 400-foot strip. During this evaluation, however, the Courier proved that this was well within its day-to-day capabilities.

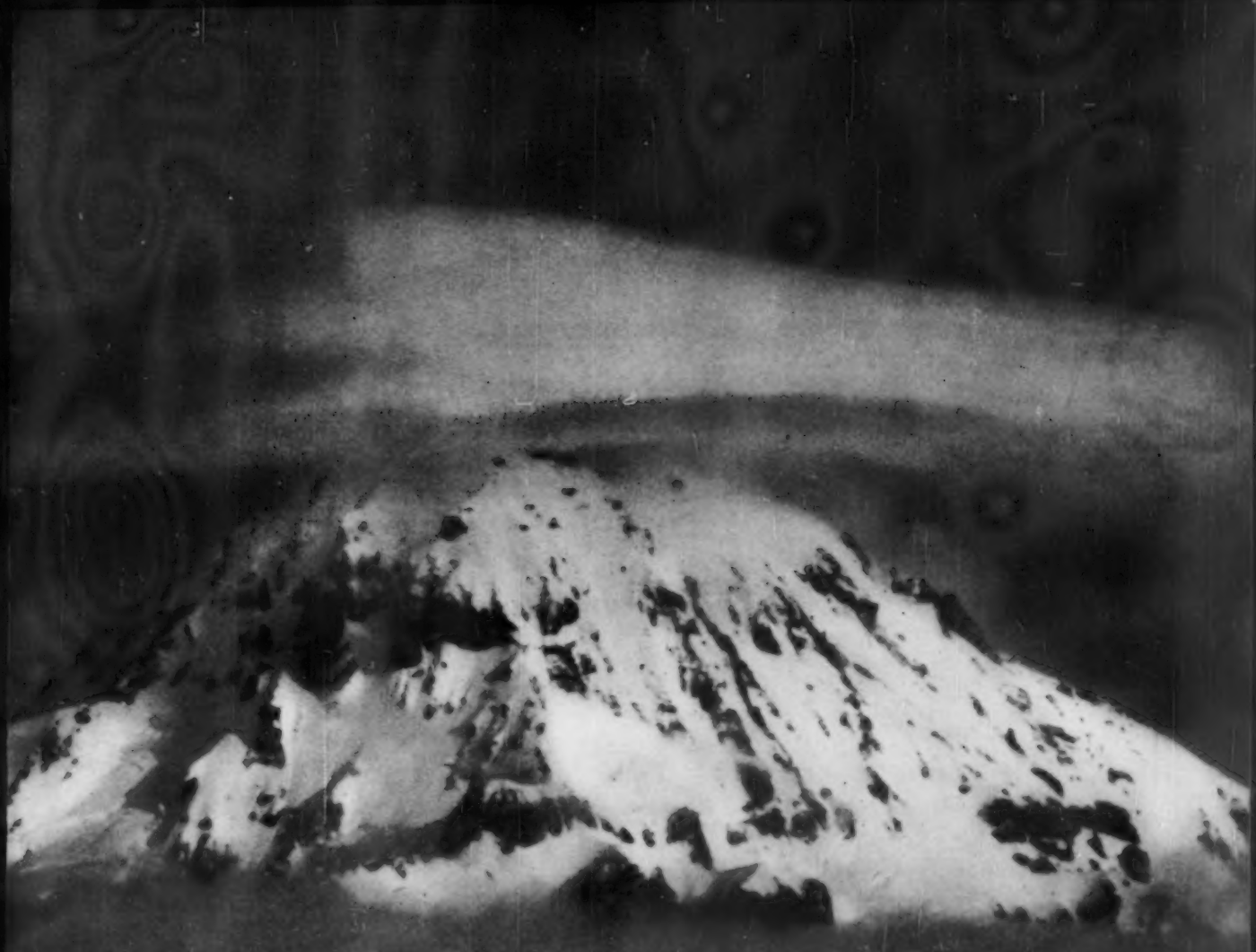
The original four-place Courier was first certificated in 1954. It is still in daily service. The design was approved for five-place in 1959; space is adequate for six people and baggage. It is the largest single-engine airplane being manufactured in the United States today —wingspan is 39 feet, length 31 feet, and height eight feet and 10 inches.

The cabin was designed in close coordination with Dr. Hugh deHaven, formerly of the Cornell Crash-Injury Research. The effects of this association are apparent. The doors are staggered, left front and right rear, to increase frame stiffness; cabin area is steel-tube construction, metal skin covered. Seats are stressed for 15 Gs; combination seat (*Continued on page* 86)

THE AIRMAN'S WORLD

Saint or sinner, the puissant wind
is jealous of all who fly
If sometime adding his knots to theirs
who venture upon his sky
But saint or sinner as case may be
and who can be ever sure,
The puissant wind has bags of tricks
to use for a pilot lure.

With puckish art he has spun a trap,
a turban of gleaming gauze
Around the head of the grim old peak
to capture an airman's gaze
For now, he reasons, will some draw near
to ponder with what a skill
He wove the gossamer glory around
the lonely Aleutian hill.



Right well he knows, the puissant wind,
such sights are the treasure store
Of the ones who cruise the fecund blue
in search of an airman's lore,
So he lays his plan with a knowing will
in confidence such as I
Will enter the hell of the lovely thing
he's fashioned upon the sky.

Tut, tut my friend, 'tis a shoddy thought
to tempt me as unaware
That maelstrom lurks in the winding mist
you spin with a devilish care!
I have known you long, too well and long
to die like a fledgling now
By the old hat trick that you love to play
with cloud on a mountain brow.

GILL ROBB WILSON

Powered by a 260-hp Continental fuel-injection engine with supercharger, the LASA 60 has top speed of 168 mph true airspeed at 12,500 ft.

LOCKHEED'S LASA 60

Left: cabin seats six, or two and 1,000 lbs. of cargo. *Center:* flap handle is in the center of the windshield. *Right:* note Fowler flaps.

By DON DOWNIE

A rugged utility transport designed for high-altitude work and for heavy-duty operations on rough fields.

THE LASA 60 is a truly international airplane. Basic preliminary design was dreamed up at Lockheed Aircraft in Burbank, Calif., back in 1958. The LASA project then moved to Lockheed's Georgia Division where the veteran lightplane team of Art and Al Mooney took over. Here the first two airplanes were built, FAA certification was undertaken, production procedures were worked out and factory tooling was completed.

The airplane is to be manufactured in San Luis Potosi, Mexico; Cordoba, Argentina and Milan, Italy.

Lockheed International plans to market the LASA 60 in the United States early in 1961 through a dealer organization similar to the one providing field service and parts for Lockheed transport aircraft.

The LASA 60 is designed to provide a local airplane manufacturing industry for simple, straightforward airplanes to speed the development of areas throughout the world lacking modern "back country" air transport.

The LASA 60 derives its name from Lockheed-Azcarate, S.A., (Spanish for "Sociedad Anonima," meaning corporation) and the year 1960. The first new factory for the LASA 60 has been completed in San Luis Potosi, some 200 miles north of Mexico City, and key Mexican personnel already have been trained in Georgia. The San Luis Potosi operation is under the direction of Gens. Juan F. Azcarate and Abelardo Rodriguez.

Gen. Rodriguez was president of Mexico from 1932 to 1934, and Gen. Azcarate is a leading pioneer of aviation in that country. He headed a company that built a number of two-place reconnaissance and training planes for the Mexican Air Force in 1930. Gen. Azcarate laid down the original design requirements for the LASA 60.

The airplane also will be manufactured in Argentina by a new enterprise, Avioned Lockheed-Kaiser, whose new factory is under construction in Cordoba, some 400 miles northwest of Buenos Aires. The No. 1 prototype airplane, flown for this pilot report, has been delivered to Argentina as their first demonstrator.

Third manufacturing site will be another Lockheed affiliate, the newly-formed Macchi-Lockheed partnership. It will manufacture the six-place aircraft at Varese on the outskirts of Milan.

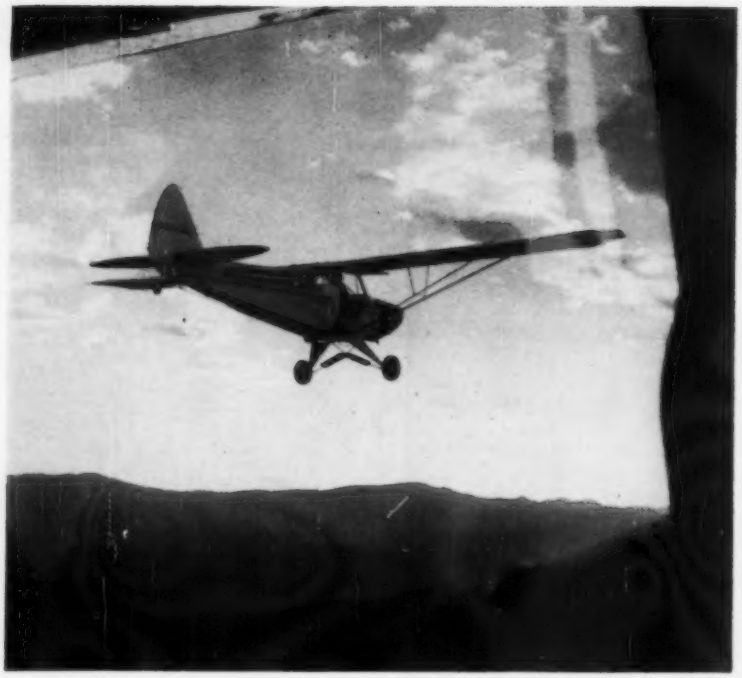
The LASA 60 looks much like any other "work horse" airplane designed to transport anything from gold, ore, burros and groceries to people. There's nothing fancy about this airplane, which has a wingspan of 39 ft. four in. and weighs 3,532 lbs. loaded.

The LASA is a corn field, dirt-and-gravel, minimum flight-strip airplane; a carry-all that in normal operation might land on a paved runway once in 50 hours.

At the Lockheed Air Terminal, Burbank, Calif., where the LASA was on display, we were introduced to Lockheed-Azcarate's chief pilot, Col. Alfonso Gandarilla, who began his military aviation career in 1938. He went through the old USAAF fighter schools at Randolph and Kelly Fields in 1940 before flying P-38s, P-39s, P-51s and P-61s. He was a B-25 squadron commander and later an air group commander.

"Which side do you want to fly from?" he asked as we walked up to the LASA 60.

"You have a full set of dual controls, (*Continued on page* 64)



The Super Cub used for operations over isolated forest regions has door panels folded for visibility.

FLYING FISH

A HUNDRED FEET BELOW the fat wings of the Super Cub I could see where someone had driven up into the rugged country above Vernal, Utah. Indifferent to the closed hunting season, they were intent only on finding their quarry and killing it. But in driving into the area, recently blanketed with a light autumn snow, they had left the marks of their passing plain to see for anyone overhead.

I picked up the trail where they abandoned the vehicle in a winter-stripped aspen thicket and followed it easily at minimum altitude and a safe 80 mph through the scattered trees. Before long I found what I was looking for—a large blur in the snow, which meant either that they had cut a free Christmas tree or they had dragged an animal of some size. One circle, taking care not to let my search disorient me from the attitude of the plane, and I had spotted the poachers back in the woods a short distance, dressing out their kill.

A pair of moose are urged through heavy snow toward a feeding ground by the low-flying patrol aircraft.

"Udell, this is Don again," I said into the mike of the Motorola walkie-talkie. "Too late. They got a large calf elk about two miles from the truck. You may be able to head 'em off between here and the valley."

Udell Gardner, in the Utah Fish and Game pickup, was posted 10 miles across the high plateaus on Diamond Mountain. He acknowledged immediately and

Two pilot-wardens prepare a load of fingerling-sized fish for a low-level aerial "planting" trip.

Qualifications for a challenging new profession range from ability to herd wildlife by airplane to tracking down and apprehending game law violators.

and GAME WARDEN

By FRANK A. TINKER

the trap was sprung. As I had assumed, the violators' casual waves at the unmarked Cub soon turned to sullen and suspicious looks. Finally, they abandoned the elk carcass and lit out for the truck, still hopelessly keeping to the woods for cover.

Although Udell had probably made several miles over the bumpy timber trail by the time they had turned their truck and started crazily down the slope, it appeared possible they might evade him. Considering the nature of their offense, I decided to slow their flight a little, at least. Leaving them, I made a low, hidden approach to a level strip a mile down the road, found it was clear, landed, and turned the aircraft so that it paralleled the right of way. One wing was purposely extended across the road.

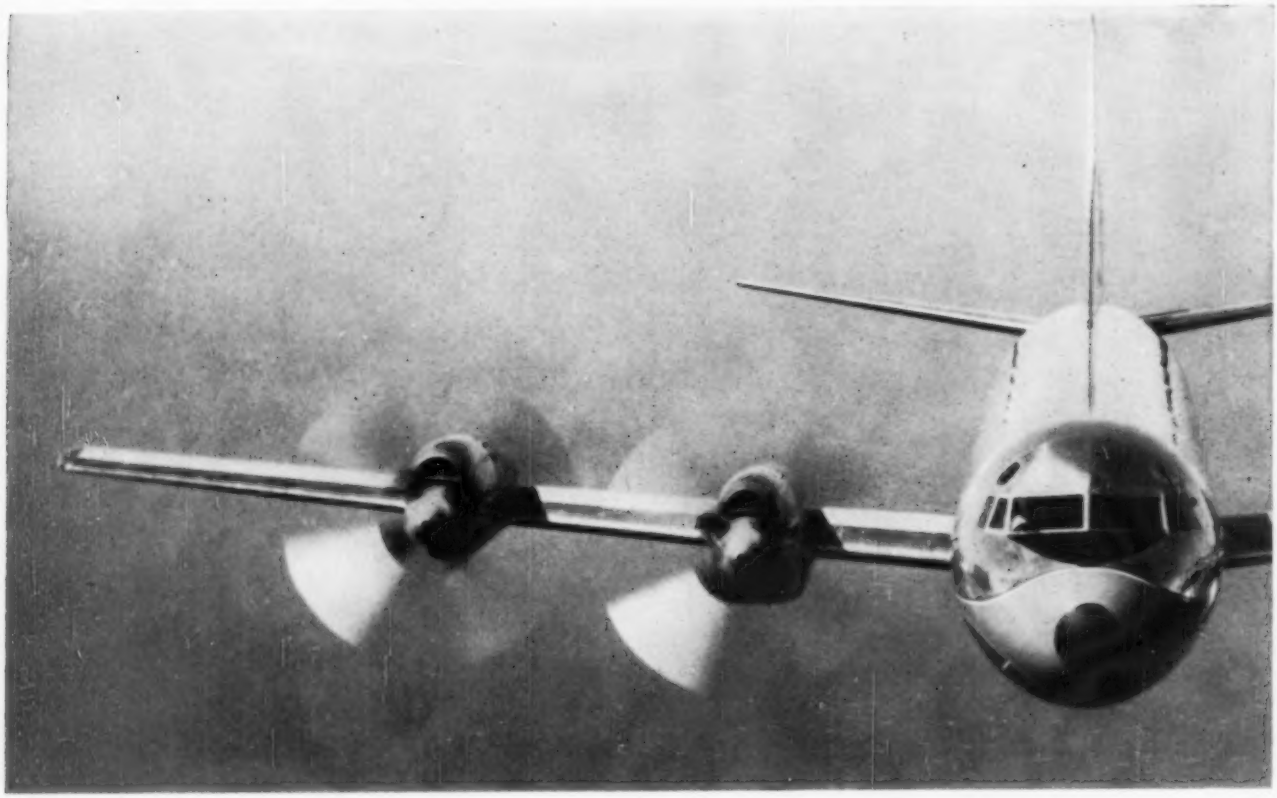
A few moments later, when the truck came barreling out of the woods, I found myself wishing that, for the Cub's sake, I had stuck to the aerial part of the job. From the way they approached, hunched over the dash of the plunging truck, they obviously had no intention of letting this fragile blockade stop them.

But just before they were to crash into the hapless craft they swerved off the road into a borrow-pit and scraped beneath the wing without even slackening speed! I hollered after them until they disappeared among the trees, then switched the tail of the lucky Cub and went back upstairs to keep an eye on them and warn the oncoming warden that these lads really meant business.

It was not until they got tangled in the traffic of the valley that we finally caught up with the violators and blocked them to a stop.

The game violator is becoming a dwindling species in those areas where consistent aerial patrol is possible. In Utah, 75 per cent of the violations in some fields have been spotted from aloft. In addition, aerial surveys have led to much better management of scarce ranges, and predator control has been made easier. Where it used to be expensive and scarcely more than a gesture to stock a few mountain lakes by pack train and impossible to reach our real back-country waters with a live batch of fry, last year fingerling trout were dropped into more than 225 of Utah's high Uinta lakes. Washington state planted 1,500,000 fish by this cheap, reliable method and California seven million. This means that many fishing areas have been opened to sportsmen everywhere and that much more material return is forthcoming from their license and tax dollars.

But these are only facts. Since I am no longer in the business, it is not immodest or even original to say that without a devoted person in the cockpit, this whole program of inestimable benefit to conservation and sport would fall flat. In order to perform the mission assigned to the aircraft– (*Continued on page* 84)

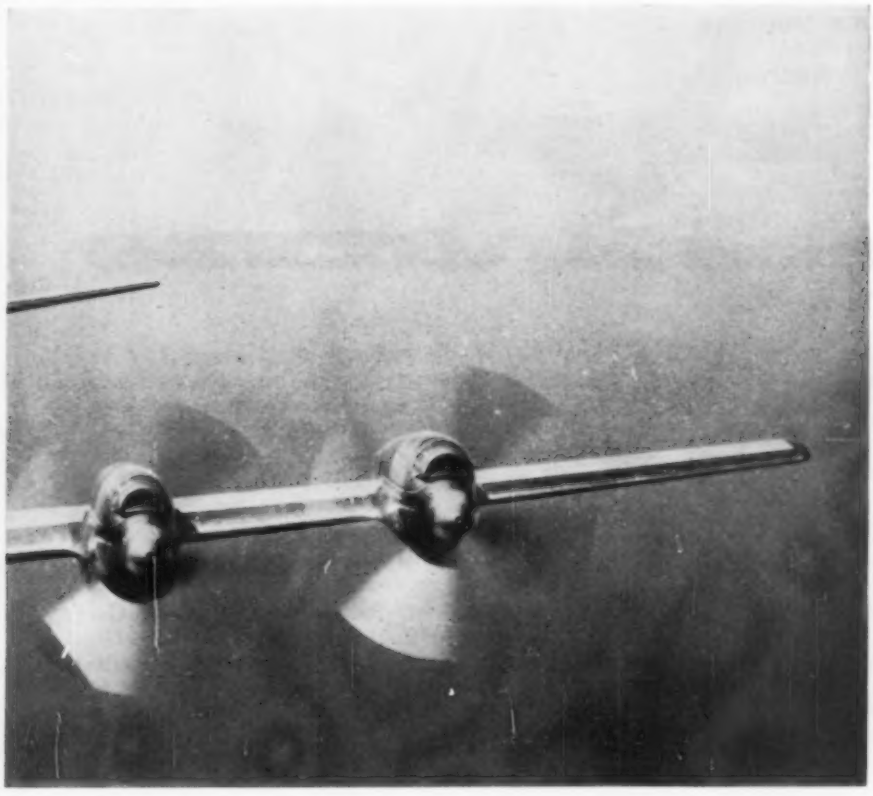


ELECTRA ON PUBLIC TRIAL

Airlines sparkplug an effective program to restore confidence in the controversial big turboprop.

By LOU DAVIS

American Airlines "fact team" clarifies the Electra story in New York. From left are vice presidents Willis Player and William Littlewood; American's Capt. Arthur Weidman, National Airlines' Capt. Don Wilson.



The 400-mph Lockheed aircraft carries 85 passengers. It has won the full endorsement of the men who fly it as a "pilot's airplane."

NEVER BEFORE in the history of aviation have so many people, organizations and interests formed opinions, passed judgment and tossed verbal brickbats at one particular airplane.

Never before has the aviation industry done so much to inadvertently hurt or intentionally help an airplane under public scrutiny or trial.

That airplane is the Lockheed Electra.

Self-styled aviation experts, misguided representatives of the public interest, headline hunters and even characters who are afraid of riding anything more mobile than a swivel chair have indulged in some hefty crepe-hanging where this 400-mph turboprop airliner is concerned.

To understand the complexities of the problem, it is important to list some half-facts and pieces of misinformation that have fallen upon air traveler's ears:

- Lockheed will discontinue the Electra because it will cost too much to beef up the wing and engine.
- The engine or propeller was the true cause of the mid-air breakup.
- Airlines are going broke operating Electras at piston-engine speeds.
- The Electra "wing wiggle" is a sure sign of weakness.
- If the plane is unsafe at 400 mph, then it must be just as risky at 329 mph.
- If birds can cause a jet to crash, then the old piston planes are the safest.
- Most often heard: "We're not getting the truth."

First let's take a look at the Electra "history." Then we will show why the Electra—and the industry itself—are going to win out and the welfare, safety and comfort benefits accruing to the jury—the air traveling public—will be greater than ever before.

Eastern Airlines and American placed 85-passenger Lockheed Electras in service in January, 1959. Today the seven domestic carriers and eight foreign airlines are operating 134 aircraft at an average of 676 flights covering upwards of 325,000 plane miles daily. More than 8,500,000 passengers have been carried a total of 4,739,000,000 passenger miles.

Basically the airplane is powered by four Allison 501-D-13 turbines of 3,750 eshp each. Span is 99 feet. Length is 104 feet, six inches. Maximum height is 33 feet. Maximum gross weight is 116,000 pounds. Best cruise speed is 406 mph.

Break-in of the new four-engine turboprop transport service-wise, was excellent. It had its share of maintenance and parts problems at the beginning, but its history was far better than any predecessor types. The Lockheed "fail safe" design philosophy demonstrated itself at every operational milepost.

Then a series of five accidents vaulted the craft into the spotlight and public controversy—even made supporters fear for the Electra's future. The accidents were:

- A crash in New York's East River, which was blamed by CAB on a combination of inadequate runway aids, variable weather during landing approach and pilot error.
- Then came two tragic accidents, when Electras literally broke up in mid-air near Buffalo, Texas, and Tell City, Indiana. In both cases 97 persons—passengers and crews—were lost. (*Continued on page* 93)

Custom aircraft modifications ranging from exterior painting to electronics outfitting are routine business for

AiResearch Aviation Service MASTERS

Above: Artist's drawings help customers visualize end result.

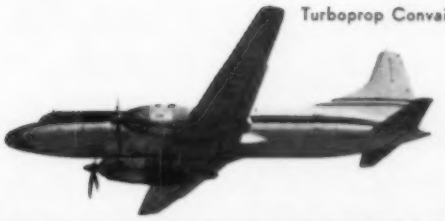
SITUATED AT the south side of busy Los Angeles International Airport, the AiResearch Aviation Service Division is known far and wide for its work in the business aircraft field. Conversions, modifications, custom interior designs, complex electronic and control systems installations are routine to this organization.

The company believes that it has modified more airplanes and designed more interiors than any other concern engaged in a similar type of business.

The relatively small division of the $100 million Garrett Corp. did not come by its popularity accidentally. For the past 13 years it has performed high quality service for every type of operation, large or small—for private pilots, corporate plane owners and airlines. It

Above: Design and engineering staff plan modifications for corporations, airlines and private pilots, as well.

Right: Custom interior designed for a Grumman Gulfstream. The firm has created many prize-winning cabins.



Turboprop Convair 540 after conversion.

OF CONVERSION

By DONALD LEWIS

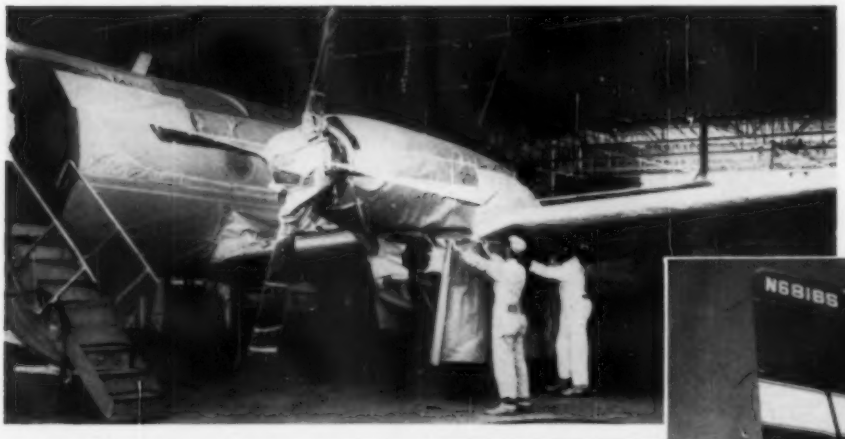
has completed 90 per cent of all Convairs converted from military or airline service to business configurations. The number exceeds 100 Convair 340s and 440s.

In addition, 150 Douglas DC-3s, 25 Lockheed Lodestars, nine Grumman Gulfstreams, two North American B-25s, a Boeing B-17 and Consolidated LB-30, three Douglas DC-6s and three helicopters carry AiResearch tags for completed interior and cockpit modifications. The design and engineering section has presently produced numerous interior and exterior decorative designs for Lockheed's new JetStar corporate transport. All of the preliminary planning is based on 10 of these fast aircraft. Designing prize winning cabins for Fairchild F-27 and Grumman Gulfstreams has already become routine.

Currently the company is modifying cabin interiors for Allegheny Airlines Convair 540s powered by the Napier Eland turboprop engines. Production lines are established in a separate hangar, and several conversions of the initial order for 10 airplanes are well underway. The long range estimate is based on 20 540s.

Convair 540 conversion to 40-seat turboprops receive airline interiors, new engine nacelles, modifications to the tail assembly and new cockpit instrumentation including weather radar and complete radio equipment. About 500 pounds of soundproofing goes aboard.

According to AiResearch sales manager Donald Neumayer, additional new business last year included interiors for the North American Sabreliner and the conversion of approximately six (*Continued on page* 88)



Left: Gulfstream undergoes extensive masking in preparation for painting.

Above: Fifty per cent of commercial work is on corporate aircraft. *Left:* Allegheny Airlines Convair 540 is prepared for installation of Napier Eland turboprop engines and new cockpit instrumentation.

A money-maker from its inception, this unusual business operates subsidy-free.

By CHARLES CARNER

"HORLICK-RACINE

The airport executives built"

THE NUMBER of airports in the nation dwindles alarmingly each year. And as the use of business aircraft expands, industrial firms are finding it more and more difficult to find facilities that will assure them year-round, daily flying operation.

This situation faced Racine, Wisconsin firms when the city council in 1949 said an emphatic "no!" to the purchase and expansion of privately owned Horlick-Racine Airport. Then Wisconsin Central Airlines a few months later flew its final DC-3 flight onto the 2,400-foot, crushed-stone runways, ending commercial service to the city.

To solve the growing problem, 11 Racine manufacturers, showing amazing foresight, banded together exactly 10 years ago and formed the Racine Commercial Airport Corp. to purchase and operate the field. Their sights were set mainly on improved hard-surfaced runways, modern medium density lighting facilities, improved aircraft maintenance, and communications.

But they surprised even themselves when the airport turned up a profit after the first year. In 1957, operations reached a high of $108,664 in sales and a profit of $10,338.

This unusual business needs no federal subsidies and

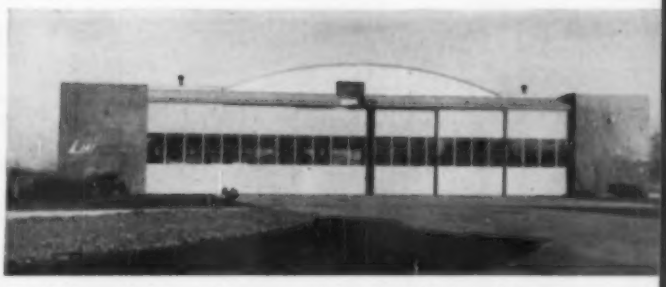
A lineman handles unicom for incoming aircraft. Unique field employs 11 full time workers to insure the year-round operations and maintenance.

Main hanger and six "Ts" are owned by the Racine Commercial Airport Corp. which operates this "business field" strictly for executive-type aircraft.

no state assistance. It not only receives no city assistance, though the community has no other all-year field, but it pays whopping real estate and personal property taxes each year plus state and federal income taxes.

With airports being squeezed out of existence by the subdivision explosion, how can Horlick-Racine resist the march? The answer is simply that to the shareholding corporation, the $1,000,000 real estate value is a drop in the ocean compared to the true worth in hard cash business sales to the firms who operate from the field. Executive "savvy" of the board of directors, each of whom serves without pay and on his own time, provides a business know-how seldom available to the average fixed base operator.

The Racine Commercial Airport Corp., now boasting 14 shareholding firms, is capitalized at $250,000. Stock owners are: J. I. Case, Massey-Harris, Inc., Jacobsen Manufacturing Co., Walker Manufacturing Co., Western Printing and Lithographing Co., Young Radiator Co., Modine Manufacturing Co., Standard Foundry Co., the Godske Co., Wisconsin Storage Battery Co., Hay Manufacturing Co., and Belle City Malleable Co.



The Johnson Air Interests' hangar contains offices for the pilots.

Horlick-Racine is located 60 miles north of Chicago, a mile inland from Lake Michigan. Three runways vary from 4,400 to 2,600 feet in length.

These firms operate 11 multi-engine aircraft, and the 16 professional pilots, and two executives who also fly, log more than 6,000 hours per year, or more than three million passenger miles.

John Sullivan, airport manager since 1950, has 11 full time employees under his wing including five aircraft and engine mechanics.

"There is practically no turnover of help including pilots," says Sullivan, "and the whole operation has become just like one big family in those 10 years."

Three runways, NW-SE of 4,400 feet, NE-SW of 4,000 feet and an E-W runway of 2,600 feet are all bituminous concrete all-weather, lighted strips that can handle everything on the field up to DC-3s and the latest, a Grumman Gulfstream.

A 24-hour weather service complete with teletypes is available on a direct line from U. S. Weather Bureau station at Milwaukee, and a telephone line direct to the Milwaukee control zone gives the executive pilots a chance to file their flight plans and receive clearance.

"Although we must maintain the visual flight rules of 1,000-foot ceiling with three miles' visibility at Horlick-Racine, it is possible for pilots to receive clearance for instrument flights direct from Milwaukee control. Milwaukee radar will vector pilots in or out of the field," says Sullivan.

Radar controlled approaches are possible, however, only if the landing aircraft makes an approach over General Mitchell Field, Milwaukee. The Milwaukee control tower uses radar to guide pilots to Racine.

Sullivan explains that when the Milwaukee radar was being installed, he flew (*Continued on page* 97)

FIG. 1
Slides in the pre-flight facts section explain aircraft axes, show a view of an instrument panel, and demonstrate control movements in a turn. The bottom slide is one of many that identify and explain various airplane parts to the beginner.

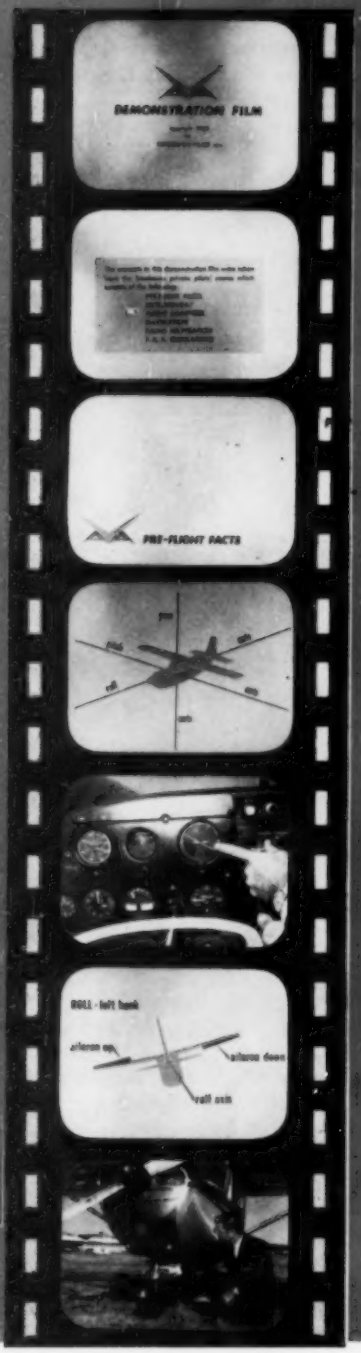
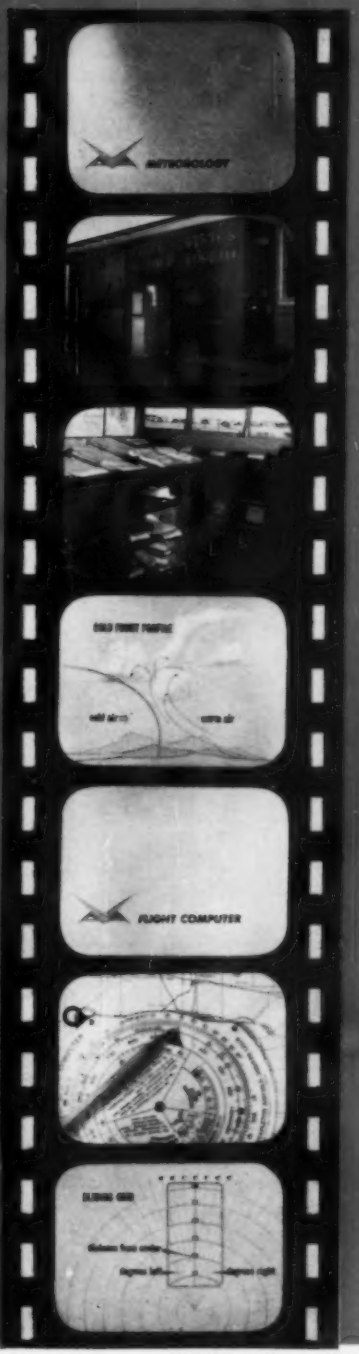


FIG. 2
In the navigation section a checkpoint is shown on the map and then matched with an actual aerial photograph. Radio navigation is explained with pictures of the equipment and sound effects. An aid to memory are FAA regulations in pictures.

FIG. 3
For meteorology the student is taken into the weather bureau with slides, and weather phenomena are shown in drawings. The use of the flight computer is another item explained to students by means of this audio-visual technique.



NEW APPROACH IN GROUND COURSE TRAINING

Components of the course include records, film strips and the study booklets. There are 1,200 colored slides and 15 hours of narration.

The student pilot may now receive a full course of study in standardized form by means of visual aids combined with recorded voice and sound effects.

By NORMAN JACOBSHAGEN

PAUL SANDERSON was operating a ground school in Miami, Fla. which offered all FAA courses from private through instruments and ATR. It involved teaching every morning from nine to 12, afternoon tutoring sessions, and evening classes from seven to 10. That's a pretty heavy work load, and Paul was enough of a teacher to realize that as he tired, his teaching ability suffered. He also began to realize that his courses varied too much. One time a private course might take 30 hours, another time, as much as 40 hours.

This started him wondering if there weren't a way in which his courses could be standardized. He wanted to be sure that every student got the same information every time regardless of the fact that the instructor might be tired or upset over family arguments.

This was the beginning of Sanderson Films, Inc. Paul laughs at his first efforts as amateurish. Maybe they were, because in 1957 he took his own color slides, did his own art work, his own narration on tape, acted as advertising manager and did his own selling.

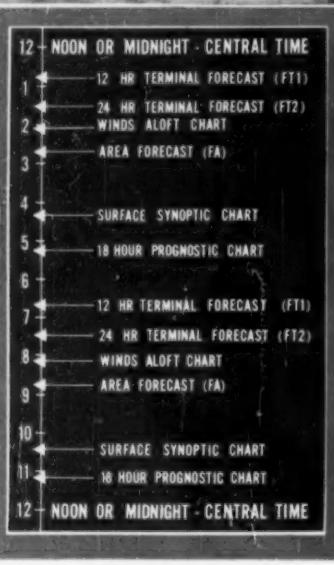
As he says, the results may have been crude, but he sold over 100 courses, and in the field they proved their worth. The material proved to be interesting and so simplified as to be easily assimilated by the student. The final proof of its value came when reports indicated that in the average unorganized ground school, approximately 95 per cent of the students passed their written exam on the first try.

The clincher came when a FAA inspector wrote his superiors, ". . . any flight instructor using this type of training aid should be permitted to instruct in an approved ground school without a ground school instructor's rating." He went even further and recommended that a change of regulation of section 50.10 be made to allow it.

The Sanderson course breaks down into seven sections. First is a demonstration film which is an introduction to the whole realm of flight. It goes over the entire field once lightly and has proven to be an invaluable tool for the flight operator to use before groups, civic clubs, prospective flight students and before airplane buyers.

Section two covers preflight facts. By narration, actual color photographs, art work and sound effects, it covers the airplane, all its component parts, instruments, engine, theory of flight, the different axes, lift, and control movements. As an example, control movements for a turn are pictured, art work demonstrates what happens, then photographs show the attitude of the airplane, the horizon from the pilot's viewpoint, and photographs of the instruments with particular (*Continued on page* 101)

GET THE MOST


12 NOON OR MIDNIGHT - CENTRAL TIME
1 12 HR TERMINAL FORECAST (FT1)
24 HR TERMINAL FORECAST (FT2)
2 WINDS ALOFT CHART
AREA FORECAST (FA)
3
4 SURFACE SYNOPTIC CHART
5 18 HOUR PROGNOSTIC CHART
6
7 12 HR TERMINAL FORECAST (FT1)
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8 WINDS ALOFT CHART
AREA FORECAST (FA)
9
10 SURFACE SYNOPTIC CHART
11 18 HOUR PROGNOSTIC CHART
12 NOON OR MIDNIGHT - CENTRAL TIME

Fig. 1
Left: This simplified chart shows cycle of information received at Weather Bureau during the 24-hour period.

Fig. 2
Right: Diagram of the U.S. showing the boundaries of the forecast areas. They cut across state lines.

ANY PILOT with an appetite for weather information will find a sumptuous meal laid out in the Weather Bureau office. But when faced with the mass of material on hand, a question often arises which is familiar at a buffet supper: "What should I take and where should I start?"

Obviously there are times when a simple check of destination, ceiling and visibility is adequate. It is equally obvious that there are times when you need all the information you can get before making the vital decision to go or stay on the ground. In this case a quick thumbing of the sequence reports does not make full use of what the weather office has to offer.

How then, do you get the best out of the Weather Bureau? The answer lies in the development of a system for checking weather information in a systematic manner, examining the various elements in a step-by-step routine. The usefulness of such a system is evident. It is the difference between an aimless wandering and a purposeful search. It eliminates forever, as you enter the weather office, the question "What should I do first?"

All that is required is the ability to read teletype sequence reports and forecasts, plus the willingness to follow the same routine each time the weather is checked. Even if the trip is short and there is not a cloud in the sky, the same routine should be practiced until it becomes second nature. The first requirement—the ability to read teletype reports—contains more significance than is evident at first glance.

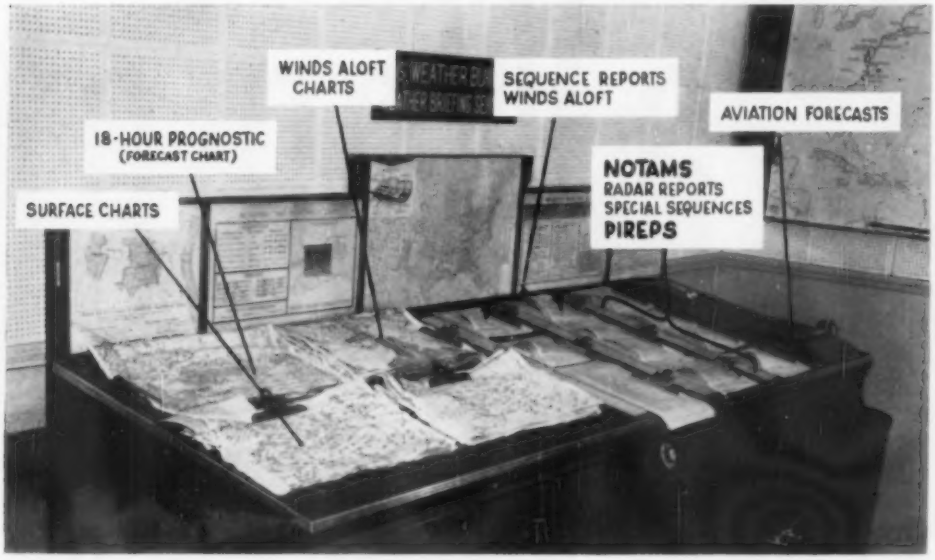
You must cast off from the protective presence of the weatherman on duty and do your own checking. There will be groans from those who have become accustomed

FROM THE WEATHER BUREAU

This recommended systematic approach will yield best results. All that is required is the ability to read the teletype sequence reports and weather forecasts.

By JACK LE BARRON

Below: The display of information in the weather office is standardized. Use of step-by-step procedure eliminates the question of where to start.



to leaning on the weatherman while he reads off the sequence reports, but the truth is that weather information is prepared in such a way as to be self-service, and that very theme has been plugged by the Weather Bureau for years.

No formal training as a meteorologist is required to understand what is on display. In fact, there is an advantage in making your own weather check. In his daily routine the weatherman has a limited time to devote to each pilot. Best use of his time comes with questions or discussion *after* the pilot has gained a general picture of the weather situation for himself.

And then there are times when the weatherman is busy on the phone or with another pilot. Why waste time waiting for him? Get started on your own weather briefing. The routine is made easier by the Weather Bureau's policy of standardizing display information.

Step one: the surface synoptic map. In spite of the formal title this is just the "weather map" seen in slightly modified form in daily newspapers and on television weathercasts. Although a few stations continue to construct them locally, the majority receive a facsimile map transmitted over the wire from a central weather office in Washington, D. C.

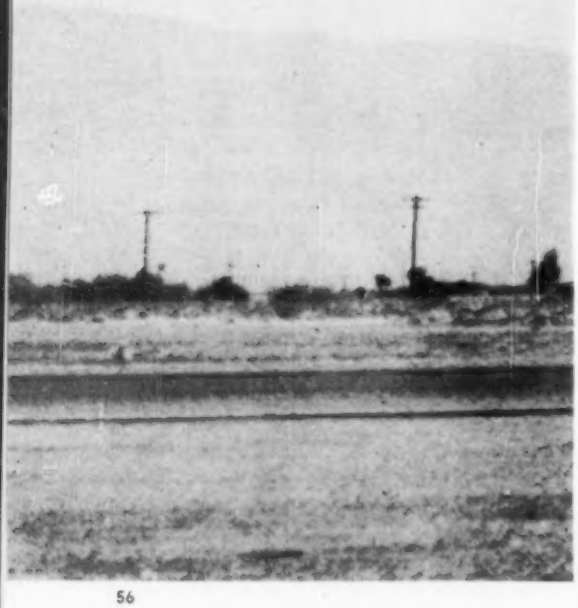
The facsimile map is extremely simplified, and its greatest value is in the visual presentation of fronts and pressure systems. Don't stop with the map on top of the stack, especially if a frontal situation is evident. Dig back through three or four previous ones and compare the movement of fronts or pressure systems. The trend of the weather now becomes apparent. Is it slowing down, speeding up, or just (*Continued on page* 89)

The Weejet takes off at sea level in 816 ft., lands full-stop in 1,292 ft.

Harold Dale transformed a vision to reality by designing and building his own small personal jet aircraft.

By DICK & JERRY ILLING

The Weejet



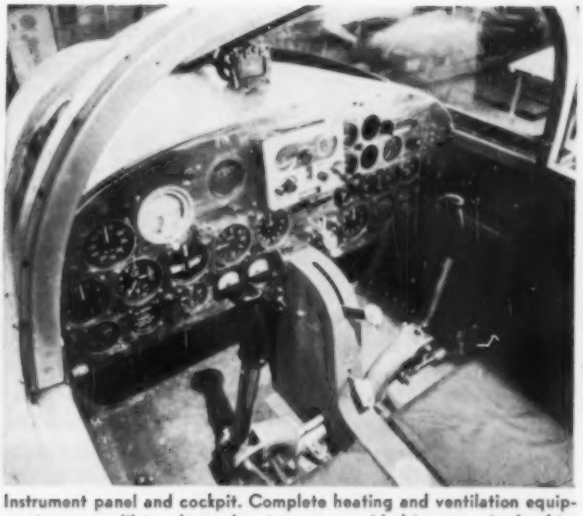
IN CALIFORNIA a man by the name of Harold Dale had a vision. And Dale was a man of action. While others dreamed of owning a small personal jet airplane, Harold decided to do something about it. He did the most obvious and natural thing—for him. He sat down at his drawing board and designed his own personal jet transportation.

The result of his efforts was the Weejet, a two-place, single-engine jet which has been the envy of all who have seen and flown it.

The aircraft has side-by-side seating and is all metal with flush riveting. Its length is just 24 feet five inches; wingspan, 28 feet. A V-tail keeps the height down to only six and a half feet. The mid-wing employs an NACA 23012 airfoil section of constant taper. The V-tail empennage is a cantilever type with electrically controlled trim tabs.

Undoubtedly, other people passed the dreamer stage and produced a few small jet designs. However, Harold Dale, who has been flying and building his own air-

Dual control sticks are provided for side-by-side seating. Jettisonable canopy has two top-hinged doors. Baggage capacity is 60 pounds.



Instrument panel and cockpit. Complete heating and ventilation equipment, oxygen diluter demand system are provided in pressurized cabin.

The small jet, powered by a Continental engine of 920 pounds thrust, has a maximum speed of 346 mph at 25,000 ft., stalling speed of 57 mph.

planes for over 20 years, took another deliberate action which put him far out in front of the others. He actually built several jets of his own design. Harold's Weejet, first flown in early 1956, was designed for a specific job —to provide fast, reliable transportation for two people at a reasonable cost. This was the area he saw being neglected by the jet designers.

Dale knew his Weejet could provide fast, high-altitude performance; therefore, his principal goal was to have a simple basic design that would result in reasonable initial cost, economical operation and maintenance costs as well as an attractive range.

The retractable tricycle landing gear is electrically operated. One motor-driven torque tube operates all three landing gear, providing positive, simultaneous operation. Emergency gear operation is by a removable hand crank in the cockpit, geared to the torque tube system.

The engine in the Weejet design is a Continental J69-T-15 of 920 pounds maximum thrust at sea level. Sixty gallons of fuel is carried in integral tanks in each wing leading edge, from root to tip. Two auxiliary wing tip tanks hold 50 gallons each. Total fuel capacity is 220 gallons! All fuel flows by gravity to an electrically driven boost pump in the fuselage. Check valves prevent slip flow. Six fuel gages indicate fuel supply. The completely equipped cabin has military type safety belts with shoulder harnesses and inertia reels. Oxygen is supplied by a diluter demand system and high pressure tank. The cabin is pressurized to three pounds psi. Complete heating, ventilating and cooling equipment is provided for passenger comfort.

The canopy is fabricated in two, top-hinged, transparent panels with three positions: locked closed, partially open for taxiing, and full open. It is jettisonable by operating a safety locked emergency release handle. Baggage is carried immediately behind the seats. A maximum of 60 pounds can be carried with full fuel load aboard.

This design has made effi- (*Continued on page* 99)

Company president John V. Baker Jr.

How Californian John Baker parlayed a talent for selling airplanes into creation of the nation's biggest Piper distributor agency.

By RICHARD BACH

FORMULA FOR SUCCESSFUL SELLING

THE WELDED steel framework that holds the high roof over the open showroom is painted black and red and yellow and blue. The deep-pile, gold-colored carpet and walnut desk of the president's office are separated only by a plate glass wall from the white concrete of the showroom floor. There isn't a single "Don't Touch" sign on any airplane in the building, and the public is invited to walk past the fountain in the patio and to wander freely among the aircraft placed on display.

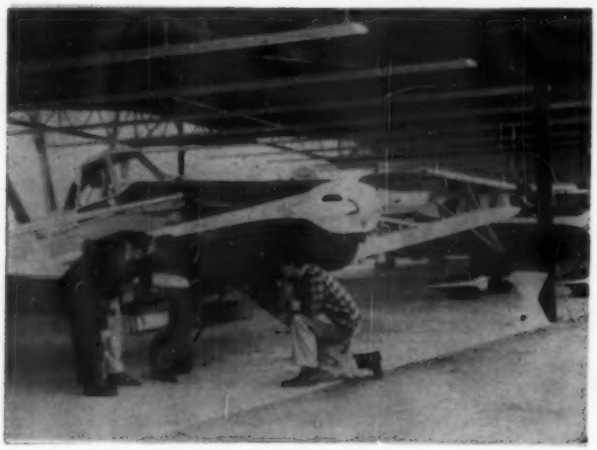
With such unorthodox ideas—typical of his sales approach, 46-year-old President John V. Baker Jr. has built Baker Aircraft Sales into the biggest Piper distributor in the nation. The firm did five and a half million dollars worth of business in 1959.

Baker Aircraft has 25 dealers in California, Nevada, and Hawaii, and from its three and a half acres on the east side of the Long Beach airport, 257 airplanes were sold last year. This year the company is reaching for a goal of 300.

If John Baker has a secret, it is a simple one: work. I discovered this one morning as I sat on the couch in his office, talking with him about the business he has built. In the two hours I was there he talked to other people on the telephone, long distance and short, 17 times. While I discreetly eavesdropped on his side of the conversations, he set up the sales of two Piper Comanches, worth $23,000 each.

On the floor, Comanche 180s and 250s stand in three different color schemes; there are two more in the storage hangars. An Apache and an Aztec are on display, with two other Aztecs in the hangar. Also in stock are two Tri-Pacers, a Super Cub, and a Pawnee agricultural plane. The prospective buyer has a wide choice of

Above: Parts department features modern decor and showcase display. *Below:* A Piper Pawnee is inspected by visitors in an outdoor showroom. *Bottom:* The new company building is located on the municipal airport in Long Beach, Calif. During 1959 the firm did five and a half million dollars worth of business.



airplanes ready to fly away, and there is a full stock of parts for all Piper airplanes. That full stock is something Baker underlines when he talks of running a successful organization.

"The dealer who orders an airplane from the company only when he has a buyer is hurting himself," he says. "Having a quantity of airplanes on hand to choose from has meant many a sale to us."

Most of the customers are not spur-of-the-moment buyers, though. The average purchaser is a modest company worth around $250,000 and working in construction, manufacturing, or sales. They are careful buyers, and when they do buy, they know exactly what they're getting for their money. Most of these smaller companies find that, in the Piper line, the Comanche is right down their alley. The Comanche, in fact, accounted for 50 per cent of all the new Piper aircraft sold in 1959, amounting to 107 airplanes, worth over two million dollars. Tri-Pacers followed with 54 airplanes sold, another $540,000 worth. The Apache came next; 29 airplanes were sold in 1959 accounting for 15 per cent of aircraft sold and another million dollars of sales. Then came the Super Cub, calling for 10 per cent of the airplanes sold, 17 of them bringing $140,000. The new Aztec, which made its appearance in 1960, has already accounted for 25 airplanes sold this year; their combined price tag comes to just a million and a quarter dollars. And new airplanes aren't all. So far in 1960, 100 used airplanes have changed hands at Baker's.

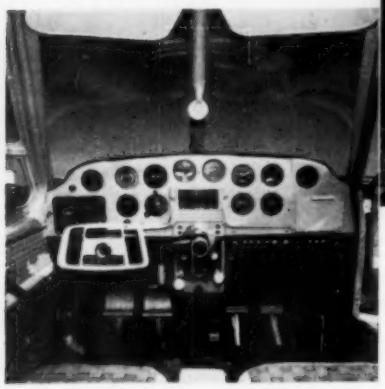
The aggressive approach which in these days has often come to mean high-pressure salesmanship, is not for Baker..

"The whole Piper approach is a low-pressure one," he says. "We sell our airplanes through their quality and their economy.

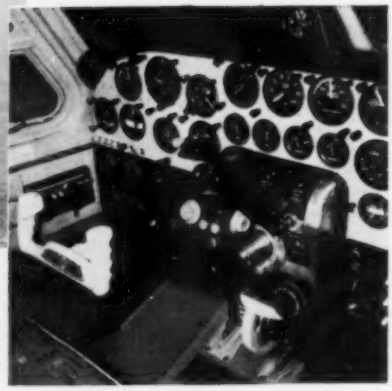
Counting John Baker, there are nine people at the Long Beach office who sell airplanes. All of them are flight instructors; none has less than 4,000 hours in the air. Baker himself has 6,500 hours, almost all of them in Piper aircraft.

The first one of his hours was flown in 1938, in a 38-hp Aeronca. He soloed in 1939 and with a friend decided to buy an airplane. His early desire to become purely an aviator changed when he began looking for that airplane. He had to search far and wide, and when he did find the right one, had to beg the owner to sell it. Baker saw that there was (*Continued on page* 70)

NEWSREEL



BEECH DEBONAIR A33 *(Above)*. New 1961 model has a useful load of 1,255 pounds, a gross weight of 3,000 pounds. Continental IO-570-J (fuel injection) of 225 hp generates a top speed of 195 mph, cruise speed of 185 mph. Standard fuel capacity is 49 gallons; range with tip tanks 1,160 miles. Service ceiling is 18,400 feet. Cockpit *(left)* includes new panel design, aileron trim control, new fabrics and carpeting, tinted cabin side windows, ventilation system. Basic cost, with exterior paint, is $21,750.



MODEL 55 BARON *(Above)*. Beech Aircraft's new light twin is licensed at 4,440 pounds with a useful load of 1,920 pounds. Five-place airplane is powered by two 260-hp Continental IO-470-L fuel injection engines. Top speed is 230 mph; cruise, at 65 per cent power, is specified as 216 mph. Range, with 45-minute fuel reserve, is 1,220 miles. Service ceiling is 19,200 feet. Cockpit layout *(right)* includes standard instrumentation; dual control wheel is optional. List price, standard model, is $58,250.

SUPER G18 *(Left)*. New picture windows (see below) identify Beech's largest 1961 executive transport. Airplane has a gross weight of 9,700 pounds, useful load of 3,810 pounds. Two Pratt & Whitney 450-hp Wasps promote speeds up to 233 mph. Range of seven-to-nine place airplane is 1,200 miles plus. Service ceiling is 23,100 feet at 8,750 pounds. Rate of climb, sea level, maximum weight, is 1,410 fpm. Features include individual oxygen-air outlets. Basic cost is $132,300.

NEWSREEL

RIVIERA AMPHIBIAN *(Above and left).* Four-place, all-metal aircraft, is made by SIAI-Marchetti of Milan, Italy, and will be produced under license and marketed in the United States by Lane Aircraft Co., Dallas. Continental IO-470-H powerplant will develop 270 takeoff hp. Gross weight is 3,130 pounds, and the useful load 1,035 pounds. Top speed is specified as 182 mph.; cruise speed, with 70 per cent power, as 169 mph. Range, with 63 gallons, is 625 miles; and at economical cruise, 1,025 miles. Note the cockpit and water attitude *(left).* Wing tip floats are retractable. The amphibian will be assembled for Lane by Southwest Airmotive. Cost of aircraft will be $35,000.

RAUSCH STAR 250 *(Above).* Conversion of the twin-engine Beech D18-S will have a gross weight of 10,500 pounds and a useful load of 3,848 pounds. Its top speed is 220 mph, and it has a maximum range of 1,550 miles. The tricycle-geared 250 will be produced by Rausch Engineering at Oakland, California, municipal airport. Interiors designed for six to 12-place configuration. Cabin is enlarged. Cost is approximately $125,000.

VICTA R.2 *(Left).* Conception of prototype being constructed in Sydney, Australia, by Victa Consolidated Industries. Four-place airplane is all-metal and powered by 180-hp Lycoming. Specs indicate a span of 32 feet, empty weight of 1,190 pounds and maximum weight of 2,250 pounds. At 75 per cent power the R.2 will cruise at 174 mph. Aerobatics included. Cost: about $12,320 for fixed-gear version; $14,560 for the retractable one.

NO. 249

I learned about flying from that!

An unbending determination to make it home despite an approaching snowstorm produces a perilous flying adventure.

By RICHARD M. BROWN

I WAS EMERGING from upper Michigan's snow-locked north woods after several days of outdoor photography. The weather had been fine during this period of camping out, but it had taken a bad turn the night before. I viewed the overcast sky with distaste as the jeep slid along the logging trails. My eyes searched hopefully for a break in that ominous gray sky, but without success.

The jeep hardly had bounced to a stop at Gogebic Airport, where I had left my plane, before I was off through the snow to the radio shack. The weather couldn't have been much worse. All along the 400-mile route home they were reporting solid overcast with only a few hundred feet below ceiling. The temperature remained right around freezing, and there was a spread of only a couple of degrees between temperature and dew point. Actually, the only encouraging note was a lack of general precipitation. This thick blanket of cloud was moving out of the north, spilling over the entire midwest—and the worst was yet to come.

It was possible that I'd be grounded several days if I didn't get out right away. Who wants to hang around here? I thought. My work was done and I could go at least as far as Rhinelander or Wausau. Maybe things would change down there. I had told everyone I would be home that night, and I was quite proud of the fact that I had never been delayed by weather. I could even navigate by "iron beam" if necessary.

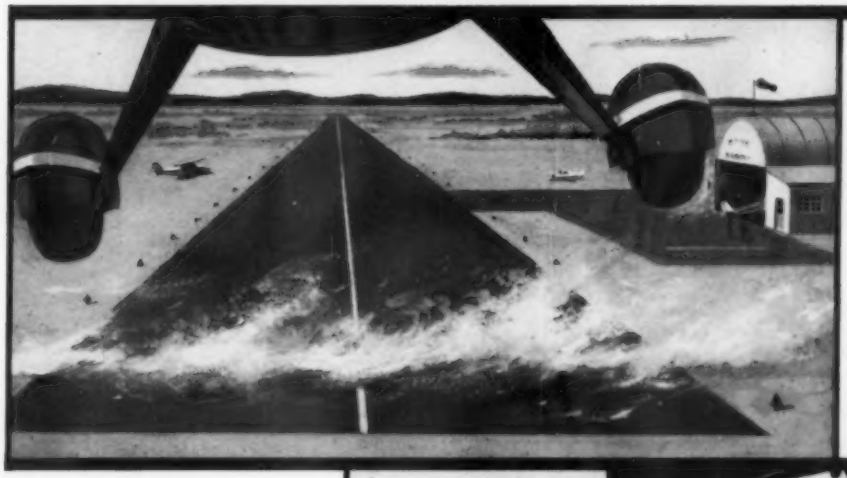
It seems the more I was cautioned by the men at the airport not to go, the more I wanted to go. I was pretty cocky, and pride was tipping the scale as I threw my life into the balance to satisfy a stubborn adherence to a self-imposed schedule.

My PA-12 droned reassuringly down the runway between mountainous banks of snow and climbed to cruising altitude. Altitude? This seemed too generous a term for the meager two or three hundred feet I was able to hold as I turned south following a road between two hills.

Gogebic Airport quickly disappeared and soon the town was lost in the mist. My gyro-compass held a steady 187 degrees as the wilderness began to slip beneath the plane. It was all dead reckoning—there are no low frequency radio navigational aids in this area. Soon I was completely lost, but I held to that southerly heading waiting to cross a (*Continued on page* 96)

"The thin dark line began to show. With a sigh of relief I straddled the lonely track and began riding the iron beam."

WING TIPS



WATCH FOR "GUST DUST"!

While making your approach, keep a keen eye out for low level, wind-blown dust near the runway. If it's moving in a different direction than the wind sock, you should expect turbulence or cross winds as you're touching down.

TUCK IN BEFORE TAKE-OFF!

Sounds fantastic, but many a carefree pilot has taken off with a seat belt dangling out the door of his plane. In flight, a dangling seat belt can create terrific noise – even damage – as it raps against your fuselage. So keep seat belts inside . . . and fasten 'em!

MEET YOUR ESSO AVIATION DEALER!

He provides you with aviation fuels and lubricants of the same high quality that has made Esso a respected name with America's leading airlines. What's more, he takes an interest in seeing that your plane gets maximum performance aloft. Next time you're touching down, make your approach at the Esso sign!

ESSO STANDARD, DIVISION OF
HUMBLE OIL & REFINING COMPANY

Lasa 60

(Continued from page 43)

don't you?" I asked. "Then let's try the left seat."

You begin to appreciate the size of the LASA 60 even before you climb aboard. It's a big airplane with 120 cubic feet of space in the cabin. Col. Gandarilla explained that there's no complicated slip-stick for loading weight and balance. If the tail tie-down hits the ground, there's too much weight in the back section of the cabin. It's as simple as that.

The cabin is 11 feet 10 inches long, an even four feet wide and four feet three inches high. The big cargo door on the right side of the cabin is actually two doors in one. The conventional door for rear seat passengers can be locked closed and then the whole side of the cabin hinges from under the wing to form a four and a half by three and a half foot cargo opening.

The cabin has been designed for easy conversion to a number of tasks. The seats can be removed and stored aboard for 1,000 pounds of cargo and two pilots. The design calls for a two-patient and attendant ambulance configuration or the regular six-place passenger configuration. Spray and dust hoppers are presently under design.

Soundproofing is supplied by simple snap-on blankets across the top of the cabin. They are easily removed for inspection and maintenance.

Col. Gandarilla and I walked quickly around the No. 1 LASA 60, XB-GUZ, and looked under the cowling before climbing aboard. There's plenty of room forward of the firewall for the 250-hp Continental TS-10-470-G fuel-injection engine. The No. 2 airplane is being equipped with an AiResearch Corp. exhaust turbo-supercharger. This 38-pound unit turns at 20-30,000 rpm and will furnish full takeoff power to over 12,500 feet. (See box on No. 2 prototype.)

The recording tachometer showed 147 hours on the No. 1 prototype as I climbed into the left seat. XB-GUZ had been certificated by the FAA in April, 1960.

Col. Gandarilla's English is many times better than my Spanish, but I snapped on the head-set of the temporary Narco installation and picked up the mike for taxi clearance.

We were cleared to runway 15. Pilot visibility in the LASA 60 is noticeably better than in many modern tricycle aircraft. Because the cockpit is so deep and roomy, the pilots sit higher than normal and you can see the ground 25 feet in front of the nose. This same seating location puts the pilot's eyes only slightly aft of the leading edge of the wing, making flying visibility excellent.

We went through the simple cockpit check before taking off the LASA 60. This airplane is conventional in almost all respects.

The fuel system for the injection engine has a simple selector valve mounted on the panel so that one draws from either 31-gal. tank (placarded to 26 gals. useable). Cruising range is from 450 to 700 miles depending on the load and power setting. A temporary 50-gal. cabin tank was installed for the ferry flight to Argentina. Fuel is 91/98 octane.

SECOND PROTOTYPE FLOWN BY FLYING

LOCKHEED'S SECOND prototype LASA 60, N601K, was flown at the company's Marietta, Ga., plant, where the aircraft is awaiting certification of the new Continental TSIO-470B 260-hp fuel injection engine with its AiResearch Corp. turbo-supercharger. Along with FLYING's editor in the aircraft was engineering pilot Glenn Gray.

The rugged aircraft is identical to the No. 1 prototype up to the firewall; will be offered to customers with the optional six-cylinder IO-470 of 250 hp in addition to the turbo-supercharged model.

Geared to high-altitude and rough field work, the small LASA 60 was flown from the long, paved runway of Dobbins AFB. Takeoff at field elevation of 1,070 ft. was into a nine-knot wind, at outside air temperature of 23 degrees C. Sea level pressure was 30.09. Roll was initiated at 35 inches mp and 2,600 rpm.

Recommended climb power with the TSIO-470B is 30 inches and 2,400 rpm.; with this setting the all-metal aircraft held about 800 fpm through 4,000 feet. Fuel pressure was 10.5 psi. Climb angle was quite shallow; visibility was good and noise level, despite the absence of soundproofing, was moderate.

At 4,500 feet, outside air temperature 14 degrees C, power was reduced to 26 inches mp and 2,300 rpm. At this power setting the LASA 60 indicated 120 mph for a true airspeed of 130 mph. Fuel pressure was seven psi.

For its size this aircraft has the feel of a heavier airplane: solid, and easy to control. During his short flight there were no "dishonest" tendencies apparent; rather a pointedly maneuverable and easy-to-fly aircraft with good slow-flight and stall characteristics.

With power to 24 inches and 2,300 rpm., the LASA 60 was slowly coaxed nose high until a "break" occurred at 50 mph indicated; at this speed the airplane was held with rudder as it gently porpoised down. Sole trim on the high-altitude bush airplane is for the rudder.

With power off, full flaps extended, aircraft was stalled at about 52 mph indicated. Wheel was held full back as the airplane again porpoised down, nose coming up as speed was gained, then again falling through. There were no sharp reactions, and control was firm throughout stall and recovery. There were no critical areas, no problem spots.

In a "base leg approach," pulling 14 inches mp and 2,300 rpm during shallow descent, aircraft was deliberately stalled during 90-degree left turn. At about 52 mph indicated the airplane recovered with a roll-out away from the turn. There was no falling-off and not tendency to snap.

Airspeed indicator of the small work-horse is white-lined from 52 to 100 mph; green line runs to 140 mph. Caution (yellow line) extends to 176 mph., the red-line speed. Landing was made with full flaps extended just prior to turning onto base leg, and power full off; a moderate glide angle was set up at 80 mph that resulted in a landing roll of about 600 feet. With power a good short-field approach can easily be negotiated. Rugged spring gear also has good cushioning effect.

The most unconventional thing about the cockpit arrangement is the location of the handle for the 20-square-foot Fowler flaps. It's mounted directly behind the windshield and hinged from the roof. This unconventional installation greatly simplifies construction and is actually quite easy to operate. There are two notches of flaps; 12 degrees for takeoff and 27 degrees fully extended.

After a simple engine run-up, we received the nod from the tower and rolled into takeoff position. The outside air temperature read 86 deg. F and a five-knot wind blew down the runway. We had a light fuel load aboard; the gauges said about 38 gals. and there were three people in the airplane. Our gross weight was approximately 2,980 pounds. Ex-C-47 pilot Wally Raabe was in the back seat. As with any new airplane on a first flight, I applied the power slowly and eased up on the brakes.

It wasn't a maximum performance operation by any means, yet we broke ground in 13 seconds. Our ground roll could not have exceeded the 1,050-foot distance called for in the specifications.

Recommended rotation speed is between

(Continued on page 66)

When you command a Beechcraft Super G18, you command the airplane that's a favorite of pilots the world over for its ruggedness and reliability under all kinds of conditions. With its big 450 hp Pratt & Whitney engines, the Super G18 carries big loads at high speeds, goes into and out of even the smallest airports with ease and safety.

Roomy cockpit has space for dual instrumentation, dual nav-com equipment and panel-mounted radar scope.

Passengers feel at home immediately in the Super G18's spacious separate passenger cabin with wide center aisle and new Skywide panoramic windows. Food bar and private lavatory make long trips in the Super G18 a pleasure.

Beechcraft Super G18...Excitingly New for '61

Few airplanes in history have earned the kind of respect and affection that thousands of professional pilots have for the Beechcraft Super G18.

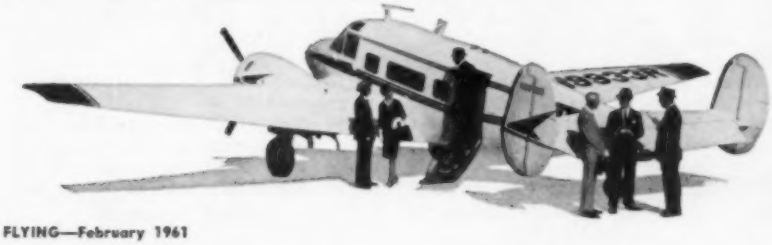
If you haven't made a close inspection of the new Super G18 lately, you owe it to yourself and your company to bring yourself up to date on the latest advancements in this remarkable business transport.

Beechcraft distributors and dealers have a standing invitation for you to see and fly it at your earliest convenience. Why not do it soon?

As you enter the cockpit, notice how much room you have to work. Check the visibility through the big wrap-around windshield. Adjust the chair to the exact position *you* prefer. Comfortable? Let's fly!

As you take the Super G18 upstairs, ask yourself whether any other airplane offers you so many of the advantages you want. Check them off: All-weather usefulness, with modern weather radar and a wide choice of factory-installed radio and navigation equipment . . . big load-carrying ability that lets the Super G18 carry up to 9 people . . . speeds up to 233 mph . . . fuel capacity to carry a full load of passengers and baggage over 1,000 miles . . . amazing short field capabilities . . . plus extremely low operating and maintenance costs.

See it, fly it, compare it—and we know you will be satisfied with nothing less than a Super G18.



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Beechcraft

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

(Continued from page 64)

60 and 65 mph. It was going slightly faster than that when I increased the back pressure to get XB-GUZ off the ground. Best rate of climb is at 80 mph to produce over 800 feet per minute, but this takes a little getting accustomed to, so I made my initial climb-out at a comfortable but unspectacular 95 mph.

The first surprise in flying the LASA 60 is the comfortable light touch on the rudders. There is no appreciable torque effect during takeoff and a very light foot pressure will make completely coordinated turns. Actually, the first few turns that I made found the ball far on the high side, indicating a heavy foot on the rudder pedals.

We climbed quickly through the haze layer and headed up over the hills that ring the San Fernando Valley. On a first flight, it's a bit of a chore to get the LASA 60 trimmed out in level flight. Visibility is so good over the nose that you think you're diving when you finally do level out. The wing has a one-degree angle of incidence (leading edge higher than trailing edge) to make this illusion even more deceptive.

There are no mile-square farms in Southern California to use for a quick airspeed calibration. However, after we trimmed out the plane we were able to indicate 115 mph at 4,500 feet with 2,350 rpm and 25 in. of manifold pressure in light turbulence that made it impossible to put the airplane "on the step." Outside air temperature was 74 degrees.

"Do you mind if we take the LASA 60 into a small, country-style airport?" I asked Col. Gandarilla. "I know that this is the only airplane of its type yet in the air (the No. 2 airplane was flown in Marietta later that week) and you don't want it bent up. If the airport doesn't look good to you, just say so and we'll pull up."

"Go right ahead," said the factory pilot with a grin. "It'll probably be a lot better than some I've already been on in Mexico."

Once over the first ridge of hills and out of the high-density traffic of the San Fernando Valley, we made a few tight turns to check out the control forces and then tried some stalls. With power off and one notch (12 deg.) flaps, it takes considerable back pressure to hold the nose up until a mild buffeting occurs at just over 60 knots indicated. Relax just a little on the back pressure and you're right back flying again.

With the long handle on the Fowler flaps, it takes very little pressure to pull down one notch (12 deg.) or full (27 deg.) flaps. The nose comes up slightly as one notch of flaps is applied, but this can be compensated for easily by a little forward trim tab. No further trim change is required for the addition of full flaps. With flaps down, the stall breaks more quickly—just as you'd want it to when coming into a small airport. The nose drops smoothly and there was no tendency for the plane to fall off on a wing to either side. Small spoiler strips are mounted on the leading edge of the wing about three feet outboard of the wing root to help achieve this smooth-breaking stall.

We headed for the nearby "6 S Ranch" in Mint Canyon. The 6 S Ranch field has a narrow 2,500-foot gravel and oiled strip at 1,349-foot elevation. There is an enormous hill just at the northeast end of the field.

We circled slowly over the airport and checked the wind sock, which showed a slight breeze blowing toward the hill.

"Do you mind if I check out these big flaps and come in over the hill?" I asked. Normal procedure for light planes here is to come in around the edge of the hill, dodge a tree, roll out and land.

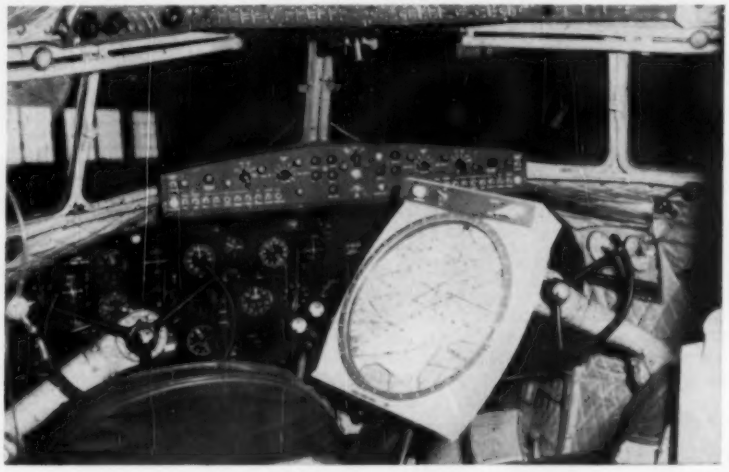
"You're flying it. Go right ahead," said the factory pilot. "We're light on weight so your best approach speed will be just under 80 mph with full flaps."

After a wide traffic pattern, we rolled out on base leg and dropped one notch of flap. I put full flaps down after rolling out on a long, high final approach. We literally slid down the face of the 400-foot hill. Even with the light weight aboard, we were able to descend as steeply as the hillside. Had there been a load aboard, we would have had to use power to get over the fence surrounding the corn field. As it was, we touched down with the wheel almost full back within 300 feet and rolled to an easy stop at mid-field.

While we were on the ground, three light planes landed in the same direction. All touched down in the second half of the runway.

The simplified landing gear of the LASA 60 is something to behold. The gear is made up of two steel tubes mounted into the fuselage with a series of rubber disks.

(Continued on page 68)



ITT'S VORTAC PICTORIAL DISPLAY

WHILE AWAITING a Federal Aviation Administration certificate as a primary all-weather navigation aid, ITT's easy-to-read VORTAC Pictorial Display was demonstrated at Teterboro Airport to FLYING.

Developed by ITT Laboratories Div. of the International Telephone and Telegraph Corp. for integration with the FAA's new VORTAC air navigation program, the display is designed to ease navigational work loads and offer a solution to the growing problems in air traffic control.

Presently priced in the neighborhood of $3,500, the unit consists of a 12-inch diameter map overlayed by two transparent discs. One of these is inscribed with a spiral line and the other with a straight line. The intersection point of the lines represents the aircraft's location.

Powered by two transistor servo amplifiers, the completely self-contained package weighs 13 pounds and is capable of holding up to 20 individual maps. (Maps are usually stored in sequence to coincide with station-to-station flight planning.) The VORTAC station is at the map's center and, for en route flying, is scaled to represent a 390-nautical mile area.

For terminal area flight a more detailed map is enlarged to show a 96-nautical mile diameter. The display utilizes bearing information from VOR and distance information from TACAN (tactical air navigation) or from DMET (distance measure equipment), TACAN'S commercial counterpart.

As demonstrated in ITT's DC-3 over a flight path that routed us across several intersections, radials, and airways, the display offered a smooth graphic portrayal of our progress. Checks were made at every opportunity to verify the aircraft's position. The cross-referenced omnis in all instances jibed exactly with the location of the crosshairs, leaving no doubt as to the accuracy ITT has achieved with its product, geared to the large executive aircraft market.

ITT also has announced that a slightly smaller display, based on a completely new concept, is being readied for the medium and light aviation fields.

The potential of the pictorial display will ultimately be in combined use with transponders. The path of an aircraft being monitored from both the ground and aloft is the key to opening new routes and gaining a more thorough utilization of air space.

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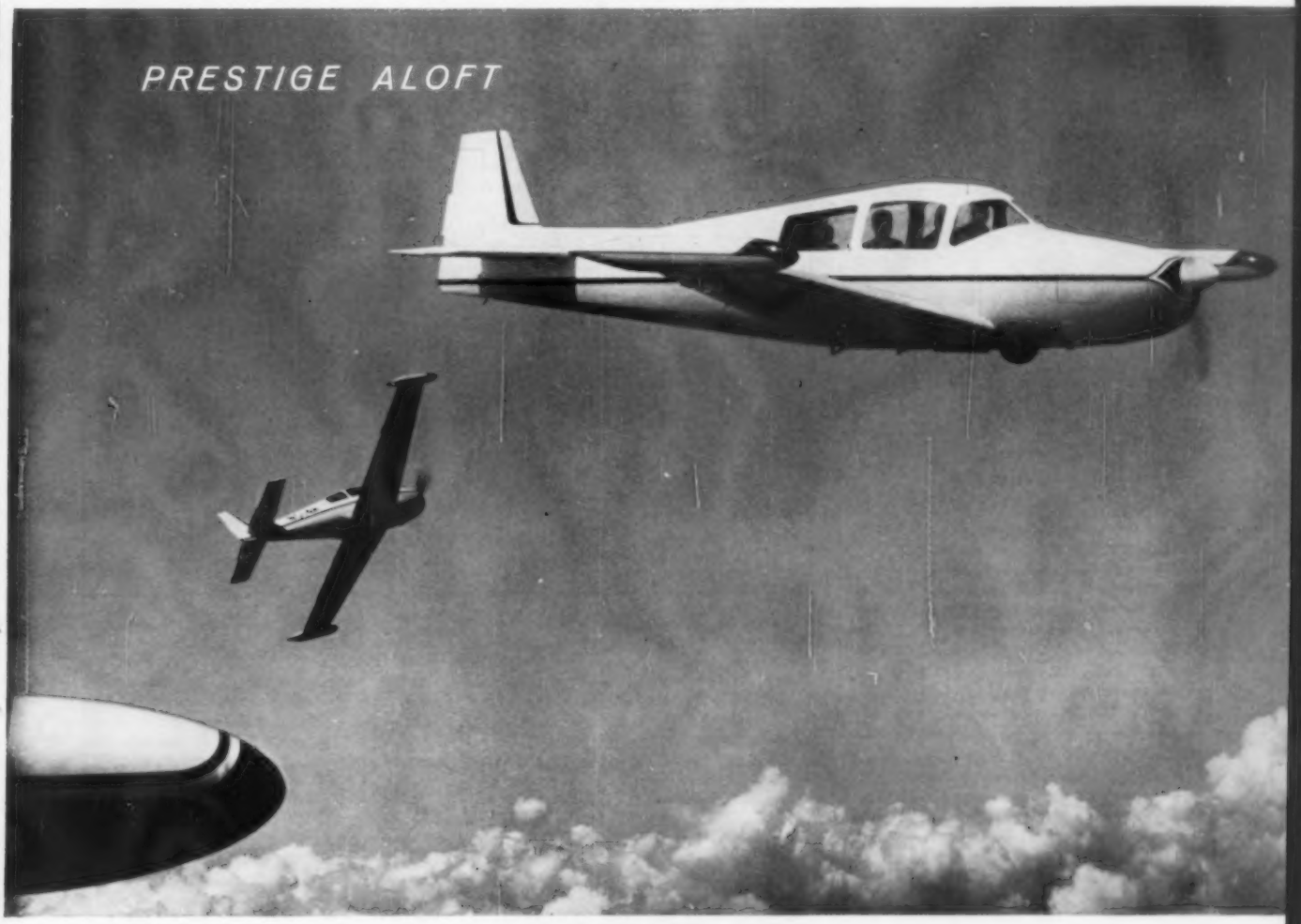


Navion AIRCRAFT COMPANY

P. O. Box 3126, GALVESTON, TEXAS

Division of Tusco Corporation

(Continued from page 66)

The main gear slants back at a 45-degree angle to further absorb landing shocks. The nose gear has a massive casting containing a pack of these rubber disks to absorb loads, attached to a swept-back fork. The maintenance-free gear has been designed for repeated rough landings.

The large housing for rubber-snubbed trunnion plates in the nose gear serves a double purpose as a rock deflector on gravel strips. The seven-foot two-inch McCauley controllable-pitch propeller has a 20-inch ground clearance for rough-field operations.

Plans call for both ski and float certification.

The day was hot—nearly 100 deg. on the ground—so we taxied up and stopped for a soda. The 6-S Ranch is a popular spot for parachute jumping and visitors at the airport gazed in open admiration at the wide cabin doors. "Golly, you could roll out of that door easy," said one young man.

For picture purposes, Col. Gandarilla took XB-GUZ around the airport once. After nearly 100 hours at the controls of a two-nation demonstration tour where everyone and his uncle undoubtedly wanted to "drive" the airplane, I think that he enjoyed the chance to do a little flying himself. He pulled the utility plane off the ground in less than a third of the 2,500-foot runway, climbed out steeply and made a circuit of the field.

Lockheed LASA 60

Specifications:	
Maximum takeoff weight normal	3,532 lbs.
Maximum takeoff weight alternate CAR Part 8	3,752 lbs.
Dimensions:	
Wingspan	39 ft. 4 in.
Total height	10 ft. 8 in.
Length	28 ft. 1 in.
Performance:	
Speed (Standard air; gross weight normal):	
Maximum at sea level	150 mph
Maximum at 10,000 ft.	165 mph
Maximum at 15,000 ft.	167 mph
Stalling speed	53 mph
Range (full fuel; gross weight):	
With reserves	550 mi.
Rate of climb:	
Sea level	930 fpm
10,000 ft.	820 fpm
Service ceiling (Standard air)	23,100 ft.
Takeoff distance (Standard air; gross weight):	
Over 50 ft. obstacle at sea level	1,045 ft.
Over 50 ft. obstacle at 7,000 ft.	1,350 ft.
Landing distance over 50 ft. obstacle	1,045 ft.

Note: Above data based on 260-hp. Continental TSIO-470B turbo-supercharged engine at 3,532 lbs. gross weight.

After landing, Col. Gandarilla climbed back into the right hand seat and I taxied out for takeoff. Even though XB-GUZ was the first LASA 60 to be assembled, the airplane was surprisingly complete. One minor cockpit installation, however, will undoubtedly be modified on subsequent airplanes. The throttle, controllable propeller control and the mixture control all have identical knobs—standard black vernier handles. They are mounted quite close together on the bottom of the instrument panel. While I didn't do it, a pilot inexperienced in this airplane could quite easily reach out to his right and pull back on the mixture control when he thought he was cutting the rpm. With the fuel injection system the powerplant stops immediately when the mixture is cut back.

We climbed away from the 6-S Ranch Airport and up over Newhall, reluctantly heading back to the Lockheed Air Terminal.

Lockheed expects the No. 2 airplane, complete with the new AiResearch exhaust turbo-supercharger, to develop a top airspeed of 168 mph at 12,600 feet. (Since the original preparation of this article, the new supercharger has been FAA approved.)

Since much of the country where the LASA 60 will be used is high above sea level, the addition of the new supercharger is virtually essential. With this new 38-lb. unit that turns 20-30,000 rpm, full 260 takeoff horsepower can be carried to over 10,000 feet, according to George B. Barrett, LAI. Undoubtedly, the bulk of the LASA 60 production will include the supercharger.

The LASA 60 is a big, comfortable, docile work horse. The plane has been designed to fill the gap between existing four-place aircraft and larger, more expensive eight- and 10-place "bush" airplanes. Selling price, with supercharger, necessary instrumentation, radio and import duty, will be in the neighborhood of $22,000. When one considers that the plane will be built in areas where construction costs are considerably lower than in the United States and coupled with the economies of overseas ferry flights or shipment, the LASA 60 should prove a bargain in transportation to many areas of the world. END

BOEING-VERTOL 107

New York Airways plans to use twin-turbine Boeing-Vertol 107s to inaugurate regularly scheduled helicopter flights between downtown New York City and Philadelphia.

The flights, between the new Manhattan heliport at Wall Street and the East River, and Philadelphia's new heliport, will take only a half hour.

Hourly trips between the two cities would be made in the new 25-passenger Vertol 107s, under an application filed with the Civil Aeronautics Board.

New York Airways anticipates that regular service could be in effect by mid-1962, "provided there is enough public interest." One-way fares of $12 to $15 are expected.

Delivery of the line's first Vertol 107, a prototype, from Philadelphia to New York's 30th Street heliport marked the opening of Phildaelphia's first heliport, located on a Delaware River pier some 14 blocks from City Hall and the heart of the city.

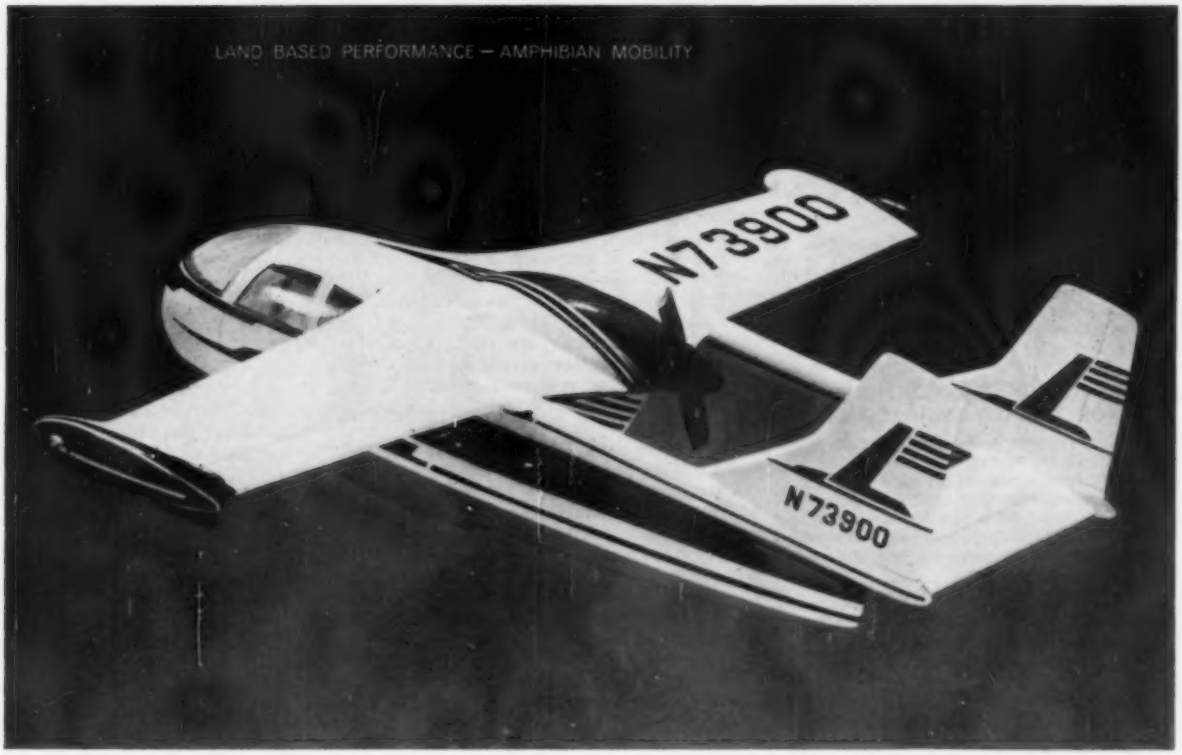
The prototype, which is being used mainly for pilot training and route checks by New York Airways, made the 74-mile trip between the two cities in 32 minutes.

Future models, powered by General Electric CT58 twin-turbine engines of 1,050 hp each, will cruise at 155 mph. Power will be upped further, later this year. The helicopter is equipped with a removable baggage pod at the rear. The main landing gear is mounted on the external fuel tanks which double as flotation cells for amphibious operations.

The 107s will succeed the 15-passenger Vertol 44Bs now in use by New York Airways. The line plans to take delivery of 10 Vertol 107s starting in April.

The twin-engine reliability will permit the line for the first time to offer passenger service at night in and out of Manhattan. FAA regulations bar night flights over water by single-engine scheduled carriers.

RIVIERA BY LANE



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Within the next few months the Lane Riviera will be in various parts of the country. If you would like to see it... or better yet, fly it, contact: **Gerald L. Spear, Executive Vice-President, Lane Aircraft, 715 Exchange Bank Building, Dallas, Texas.**

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Formula for Selling

(Continued from page 59)

room for great progress in the world of airplane sales. He sold their first airplane at a profit, and bought another, which he also sold at a profit. It was then that John Baker decided that his future lay in selling airplanes. To learn about the airplane he wanted to sell, he joined the Piper Aircraft Corp. in 1943 and worked at the Lock Haven, Pa., plant for six years. In 1949 the opening for which he was waiting appeared. Harvey Martin, owner of Aircraft Associates in Long Beach, was selling his business. On the ninth of July a new sign went up, and Baker Aircraft Sales became a reality.

When John Baker bought the company, Aircraft Associates was doing a $450,000 annual business. Ten years later business was just a dozen times better, sales touching five and a half million dollars for the first time.

Though the largest part of his income is from airplane sales, services play an important part. With every airplane sold to a customer who is not a pilot, free services of a rated flight instructor are available until the customer passes his FAA Private Pilot flight check. If a single-engine pilot buys an Apache or an Aztec, the services of the flight instructor are there, again free, until the customer receives his multi-engine rating. Any maintenance required during a new airplane's first 100 hours is also on the house.

One of the keys to aircraft selling at Baker's is the ability to tailor financing to the customer. "There are few successful businesses with enough loose cash in the bank to walk in and buy an executive airplane," Baker said. "That's why I insist that my salesmen know what can be done financially. We have to be prepared to fit our financing to each individual customer, and set him up in the best possible way to own his airplane."

Along with this solid knowledge of what can be done to finance airplanes for people, the salesmen follow his own philosophy of selling.

"It doesn't do anyone good to criticize the competition," he said. "Practically the first thing I say to a prospective buyer is that no matter which of the four major manufacturer's airplanes he buys, he will be getting a good airplane and a safe one. We never give the negative aspects of other airplanes. We simply show why a Piper airplane is a good choice. We give figures on performance and economy that let the airplane sell itself.

"Along with this attitude and low pressure, we put a lot of faith in our showroom. The open floor idea has turned out to be a good one; we keep the aircraft on display in spotless condition—that's very important—and encourage anyone who wants to come in and look around." He smiled and looked up at the bright girders over the showroom. "That was one of the best ideas we've ever had," he said. "You should come out here on a Sunday afternoon and see the people who stop by and look at our building and the airplanes. Those bright colors and the gay paint of the airplanes themselves give the building almost a festival feeling. It creates an atmosphere that makes it easy to be friendly, and incidentally, to sell airplanes."

Gretchen Zeiss, niece of optical genius Carl Zeiss, handles all the contracts for Baker Aircraft, and has been with Baker since he began in 1949. "This office never slows down," she said. "One day we counted the telephone calls that came in through us to all the departments in the building. At the end of the day we found that we had received a call every four and a half minutes!"

John Baker doesn't believe in standing aloof from his dealers. Fully half of his time is spent on trips to see them, and together they handle problems of business operation that one man wouldn't be able to handle.

Though 90 per cent of his business travel is done in his own airplanes, his executives and salesmen fly on scheduled airliners to Lock Haven to pick up new airplanes. In 1959 this airline travel alone amounted to $20,871, a fair indication of an active organization.

Baker has definite opinions about the place of the sometimes-forgotten man who flies his airplane only for the fun of flying. "Our average individual customer is a professional man or a farmer," he said. "Generally they buy a Tri-Pacer or a Caribbean, occasionally a Comanche. We see quite a few individual owners who fly for fun buying our used airplanes and trade-ins. General aviation owes its lifeblood to these private pilots for supporting it before corporations thought of owning airplanes, and these same pilots are very often the ones who urge their own companies to see the advantages of flying in the business. The real reason behind many of our sales here is that one man who loves to fly airplanes."

The colorful showroom building held a formal opening on the ninth of July, 1960, just 11 years since purchase of Aircraft Associates from Harvey Martin. After less than six months in his new building, a still bigger one is already coming off the drawing board.

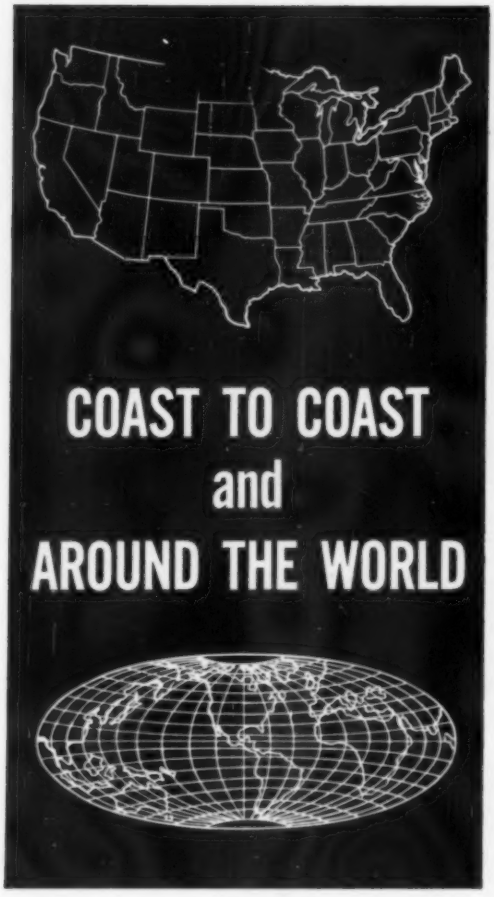
The phone rang, for the seventeenth time since I had sat down on the white couch in his office.

"Sure thing, Barney," he boomed. "I'm going to be up San Francisco way tomorrow, be glad to drop in on you. How about two o'clock? By the way, a friend of mine up that way bought a Comanche from us a couple of years ago; he'll be interested in seeing a new '60 model." He glanced at his watch. "I have to run down to San Diego this afternoon yet, Barney. See you tomorrow at two."

Leaning on the chainlink fence, I watched John Baker toss his briefcase into a Comanche on the line and heard him call, "Clear!"

The phenomenal success of his organization is reflected in the way his business is run and even in the buildings themselves. Baker has ideas and he uses them.

His Comanche rolled easily to the runway. The smooth purr of the engine rose a note as the throttle went forward, and in a few seconds the wheels were off the ground and tucking themselves into the wing. The trim airplane turned right, out of traffic, and in a minute was a dwindling silhouette in the south. END



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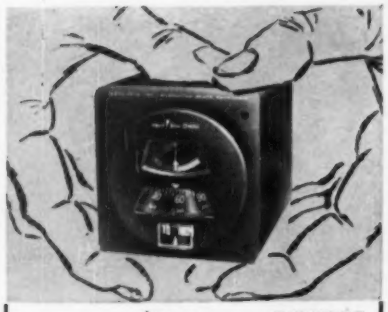

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Sikorsky HSS-2

(Continued from page 35)

are interchangeable and pre-tracked at the factory. The automatic blade-folding equipment on the HSS-2 which facilitates military handling aboard ship will not be included on the S-61.

Naval rotorcraft incorporates within its boat hull a most advanced helicopter weapons system. Complex radar, automatic stabilization and navigation equipment and radio altimeters are coupled to the system through an intricate series of linkages to provide automatic control.

By further linking the gear to Sonar (sound navigation and ranging) in the performance of its anti-submarine warfare (ASW) mission, an automatic Sonar hover can be established as the helicopter is held in position over the Sonar ball with far greater precision than piloting skill can offer. All-weather, around-the-clock readiness is further enhanced by the addition of anti-icing for rotor, engines, and windshield.

The dollar value of electronic equipment in the HSS-2 is estimated at roughly 50 per cent of the aircraft's total cost. Although much of this gear is extraneous to the S-61, the benefits accrued from the design research of the military model are responsible for the high standard of performance expected in the commercial version.

THE aircraft's over-all length with blades extended is 72 feet five inches. Its fuselage from the nose through the tail rotor measures 54 feet nine inches. Both the hull and sponsons, under which retractable wheels are mounted, are watertight and compartmented.

Two separate fuel cells with a total capacity of 4,504 pounds are located in conveniently low, protected areas within tub structure. This allows quick, efficient refueling with a minimum of danger.

The landing gear allows high-speed taxi, and repeated landings and takeoffs from rough or improved terrain, water, or any other surface. Landings have been made in full autorotation with complete satisfaction. Although the retractability will not be built into the S-61, all other qualities of the gear will be retained.

All-weather alighting, water handling, and water takeoffs, while not a part of the evaluation, have been successfully demonstrated by the HSS-2.

The cockpit location is on-level with the cabin section and the side-by-side pilot seats are on 21-inch centers off the center line. This allows common usage of the engine speed controls and other switches mounted on the overhead panel, and of the ASE, radio and navigation equipment on the console rising out of the flight deck between the seats.

Dual flight instruments are set into the panel in front of each seat, and essential engine instruments are centered for easy viewing by both pilots. Excellent visibility is achieved by the use of transparent panels over and around the instruments and on either side of the overhead.

After adjusting to the cockpit, and with the temperature on the field at 28 degrees F, the anti-icing system was switched on. For starting, the transmission has been designed to allow one engine to furnish ground accessory power for operating hydraulic and electric systems without turning the rotor. This is accomplished by adding a shaft to the accessory section of the main gear box.

The engine may operate at any speed required by the accessories, and is allowed to furnish power to the rotors only after the second engine brings the rotor to speed. The rotor is held motionless in ground idle by a rotor brake which is released as the No. 2 engine is brought up into its operating range.

There is no throttle control on the collective since the constant-speed automatic control allows the cockpit levers overhead to be set at the desired rpm. Once adjusted, the automatic feature of this device maintains rpm regardless of the power demands imposed.

In the HSS-2 the key instrument is the torque meter, which gives the pilot—in per cent—the amount of power being used in a ratio with the amount of power available.

Along with FLYING's pilot during the evaluation were Sikorsky's Robert Decker, assistant chief pilot, and Jack Peterson, experimental test pilot.

Taking off into the 15-knot wind with gusts up to 25 knots, at a 16,000-pound gross weight (some 200 pounds below the average gross weight), the HSS-2 required 55 to 60 per cent of torque as a smooth break with the ground was completed. Climb-out at 70 knots, while increasing the torque to 80 per cent, gave us a 2,000 foot-per-minute rate of ascent.

At 1,700 feet the aircraft was nosed over to pick up a normal cruise speed of 120 knots with the gear down. Torque was reduced to 55 per cent to maintain the cruise altitude. The gear was raised, increasing airspeed to 125 knots.

In this configuration the HSS-2 is very responsive to all applied control pressures. Turns in cruise point up the -2's stability as hand-off flight—without the use of the automatic stabilization equipment—can be effected for minutes at a time.

Using the ASE, the aircraft holds heading and altitude without any necessary control manipulation. For turns a "turn" button on the cyclic is depressed to gain cyclic control.

The directional control pedals synchronize automatically with the cyclic movement for a coordinated standard rate turn. At the desired heading the button and cyclic are released and the helicopter continues on its new course. An "all-direction" trim button at the top of the cyclic is used for minor altitude adjustments.

WITH the ASE release button depressed to regain manual control, the -2's airspeed was increased for a high speed Vne (never exceed speed) run.

As the airspeed indicator passed 135 knots, vibration increased, and up toward 140 knots it was considerably heavy but at no time unmanageable.

At this point the onset of blade-stall, artificially induced by high power settings in the high-speed range, was easily recognizable by a five-per-revolution beat (the beat of all main rotor blades during a single revolution of the shaft). This was

(Continued on page 75)

OX-5 Travel Air—1926

One of the most popular planes during the twenties was the "Travel Air" powered with the immortal OX-5 engine. At the end of World War I more than 9,000 OX-5 Curtiss Jennies had been produced. A total of 15,000 OX-5 engines along with spare parts were available to the public. They were inexpensive (as little as $50.00) and so plentiful that it brought flying within reach of many who would otherwise not be able to own an airplane. Of the many fine planes designed around OX-5, the Travel Air was one of the most sturdy and maneuverable. Parks College, already established as one of the nation's foremost aviation schools operated an OX-5 Travel Air fleet for training purposes. Men who learned to fly in these planes are leaders in aviation today. Never before has the need been greater for competent young people in the field of aeronautics. There is a place for you! . . . NOW is the time to train! Ask for Parks College View Book. See for yourself how Parksmen live and learn. There is nothing to lose . . . and much to gain!

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KING Man Philip L. Stomberg,
Executive Vice-President
Aerodynamics Inc.
Pontiac, Michigan

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"Pontiac unicom is normally set at 33% volume. At a setting of 25%, Pontiac reported 2 points above normal on volume and clearness. After taking off, at 200' above ground we talked to Detroit area radio 27 statute miles; their reply 5 x 5.

"Called Detroit City tower 600 feet above ground 5 x 5, 25SM; tower reported excellent reception for distance and height.

"Called Flint tower 700 feet above ground and 24 SM away. They replied it was amazing for our altitude to be so loud and clear.

"Called Lansing radio 1200 feet above ground, distance 57 SM. Received no answer and began climb. At 1800 feet above ground began to hear them calling us by number, so first transmission must have gotten through. At this altitude they were able to reach us and stated never had they been able to carry on such distinct communication in this area at this altitude and distance.

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Philip L. Stomberg

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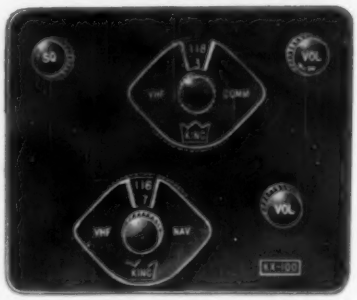

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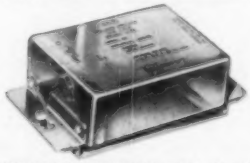

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(Continued from page 72)

felt throughout the aircraft and feeds back into the cyclic and collective. The blade-stall condition is readily corrected through the normal recovery procedure of 1) slight collective reduction and 2) the slowing of airspeed.

Returning to normal cruise, the No. 1 engine was pulled back (splitting the tachometer needles) to simulate engine failure. A loss of this type is immediately compensated for by an automatic increase in torque per cent of the engine still in operation, as it takes over the function of both engines to retain the pre-selected rpm. By reducing airspeed to 75 knots, single-engine performance was such that a climb was commenced at the rate of 400 fpm.

In the unlikely event of simultaneous engine failure, not evidenced during this evaluation, full autorotational landings can be (and have been) made with less than a 50-foot ground roll.

FOR entry into a power-on approach, airspeed must be checked due to the ease with which momentum picks up—creating the possibility of an overshoot of the selected landing site (a longer glide ratio is the result of higher speeds in rotorcraft descents).

At 70 knots, carrying zero to three per cent torque, a comfortable approach can be made. At 120 feet airspeed is slowed by a very slight flare. The flare is held to dissipate speed still further, and power eased in to check the rate of descent. At about 40 feet the nose is leveled and the touchdown cushioned with power.

Low work consisting of turns-on-a-spot and sideward and rearward flight from a hover, without ASE, were looked at to gain an idea of the helicopter's handling characteristics in the ground effect range.

Control manipulation in hovering flight, and in all other flight conditions requiring increases or decreases in power settings, has been greatly simplified in the HSS-2 by a "pitch to yaw" coupling. This coupling eliminates the need for rudder pressure in the large amounts usually demanded by the torque of the main rotor, by automatically changing the tail rotor pitch as collective is added or reduced.

While going through turns-on-a-spot, the large tail-boom section must be considered as the aircraft presents its broadside to the wind. Turning into a good wind requires strong application of directional control pressure, while entering downwind a lead-in with opposite pedal is necessary to complete a smooth flight pattern.

Rearward and sideward flight are routine maneuvers as the HSS-2 responds like its much smaller counterparts.

Hovering with the ASE turned on eliminates handling of the controls for heading and altitude but does require application of cyclic. Operated in conjunction with Doppler navigation equipment, the -2 will maintain a set position over the earth's surface, determined by bearing impulses, in complete hands-off flight.

As Harlow Smith, supervisor of Sikorsky's flight development section said, "The HSS-2 either exceeds or meets its performance guarantee right down the middle."

In looking at the rotorcraft from an engineering point of view, the extensive test program undertaken by Sikorsky resulted in many design improvements and the establishment of fatigue lines for all present components including those that have been carried over into the S-61. A minimum overhaul life of 1,000 hours is expected on the commercial aircraft by its delivery date.

SIKORSKY HSS-2

Search and Attack Mission, Guaranteed Performance
(General Electric T58—8 turbines)

Gross weight at start of mission	17,300 lbs.
Basic weight empty	9,953 lbs.
Sonar provisions	901 lbs.
Weight empty, sonar	10,584 lbs.
Useful load	6,446 lbs.
Crew (4)	800 lbs.
Weapons (2)	840 lbs.
Sway braces and shackles (2)	37 lbs.
Trapped fluids and miscellaneous	265 lbs.
Fuel	4,504 lbs.
Service ceiling	11,000 ft.
Gross weight less fuel	12,796 lbs.
Per cent military power to hover at takeoff gross weight	75% MP
*Endurance, sea level	4 hrs.
Vmax, sea level	130 kts.
Best rate of climb, normal rated power	1,800 fpm.
Hovering ceiling, military power, (out of ground effect)	8,000 ft.

* 50% hover, 50% cruise at 100 kts., reserve 10% initial fuel plus fuel for warm-up, start, takeoff, etc. for 3 min. at normal rated power.
An HSS-2 has actually flown a simulated ASW 4 hour mission, including 50-50 hover to cruise time and 10% reserve fuel.
An attack mission may be performed by cruising out 240 naut. miles to the target at 132 kts. average speed (70% N.R.P.), dropping weapons (840 pounds), and returning at economical speed.

Major innovations have been incorporated into the HSS-2 to decrease maintenance man-hours. All dynamic components are located above the fuselage, and easy-opening panels and work platforms make the main rotor and transmission sections work accessible in a matter of minutes.

Fewer moving parts and use of rotary rather than reciprocating motion lessens wear, eliminates the need for fan and clutch assembly and thus reduces maintenance time considerably.

Complete engine removal has been demonstrated in 18 minutes, using a light helicopter-supported hoist, and major engine components can be disassembled with standard wrenches and a minimum of special tools.

In comparison with present anti-submarine warfare helicopters, the greater speed and striking power of the HSS-2, with its additional Sonar range, creates an ASW improvement ratio of 10 to one in total square miles covered. The twin-turbine performance with single-engine capability, plus the boat hull, make this a safe, efficient aircraft for its naval mission.

Commercially, the S-61 has benefited greatly from the military design, engineering, and testing. Through this combined effort a long stride has been taken in giving the helicopter industry a feasible aircraft around which to build a realistic profit picture. END

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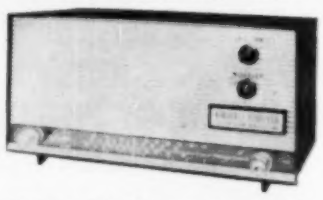

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Sperry

(Continued from page 38)

stall, and Lawrence "learned about flying from that." The glider was demolished, but the boy was made of sterner stuff.

However, now was the time for parental intervention. Lawrence's health was suffering from night concentration on his airplane design work in addition to school. He was packed off to prep school in Arizona, where they concentrated on horses, archeological explorations and that sort of thing. This would distract the boy from his flying occupation? Father Sperry might have known better from his own history of dogged determination. Shortly, Lawrence had the Mesa boys building gliders! At the end of the school year he came back home looking like a cowboy but, under the sombrero still a pilot.

The family faced up to the fact that they had a chip off the old block on their hands. They weren't going to divert Lawrence so they had better ponder how to direct his enthusiasm.

Shortly before this, in 1909, Sperry had talked to a new found friend, Stanley Y. Beach, on the possibility of gyro stabilization of aircraft. Beach, editor of the Scientific American, thought the idea had merit. He agreed to cooperate with Sperry on a plane he was designing. Sperry and Ford built the gyro but nothing came of the matter. It is mentioned here merely as the first recorded marriage between aviation and the gyroscopic principle.

I have often wondered if Sperry's attention was called to the need of the airplane for stability by his friend, Thomas Edison.

Following the 1908 crack-up at Fort Meyer in which Tom Selfridge had been killed and Orville Wright badly injured, Edison had remarked, "The weak point of the present aeroplane, around which the Wright brothers will never be able to get, is that the operation of the machine lies wholly in the wonderful brain of its operator."

Edison's pert comment was widely quoted and Sperry may have felt a challenge to provide pilots with some relief from their complicated control systems. Mr. Edison, incidentally, always did take a wry view of the complications of the airplane. One time we coaxed him down to Newark to see one of Harold Pitcairn's autogiros perform. After the thing had gone through its paces, we asked Mr. Edison what he thought of the performance. With a twinkle in his eye, he slyly answered, "I don't believe it." He just wasn't going to commit himself to a contraption that shivered and shook and involved so many compromises.

Now, as father Sperry pondered how constructively to direct his son's interest, he had to admit that aviation might have some substance. After all, what great utility had electricity demonstrated when as a boy he had helped to build a first crude dynamo?

And didn't the airplane seem to be dynamic already? The press was full of the Wright-Curtiss patent suits. Notable flights were filling the headlines. Wilbur Wright had come to New York for the Hudson-

(Continued on page 78)

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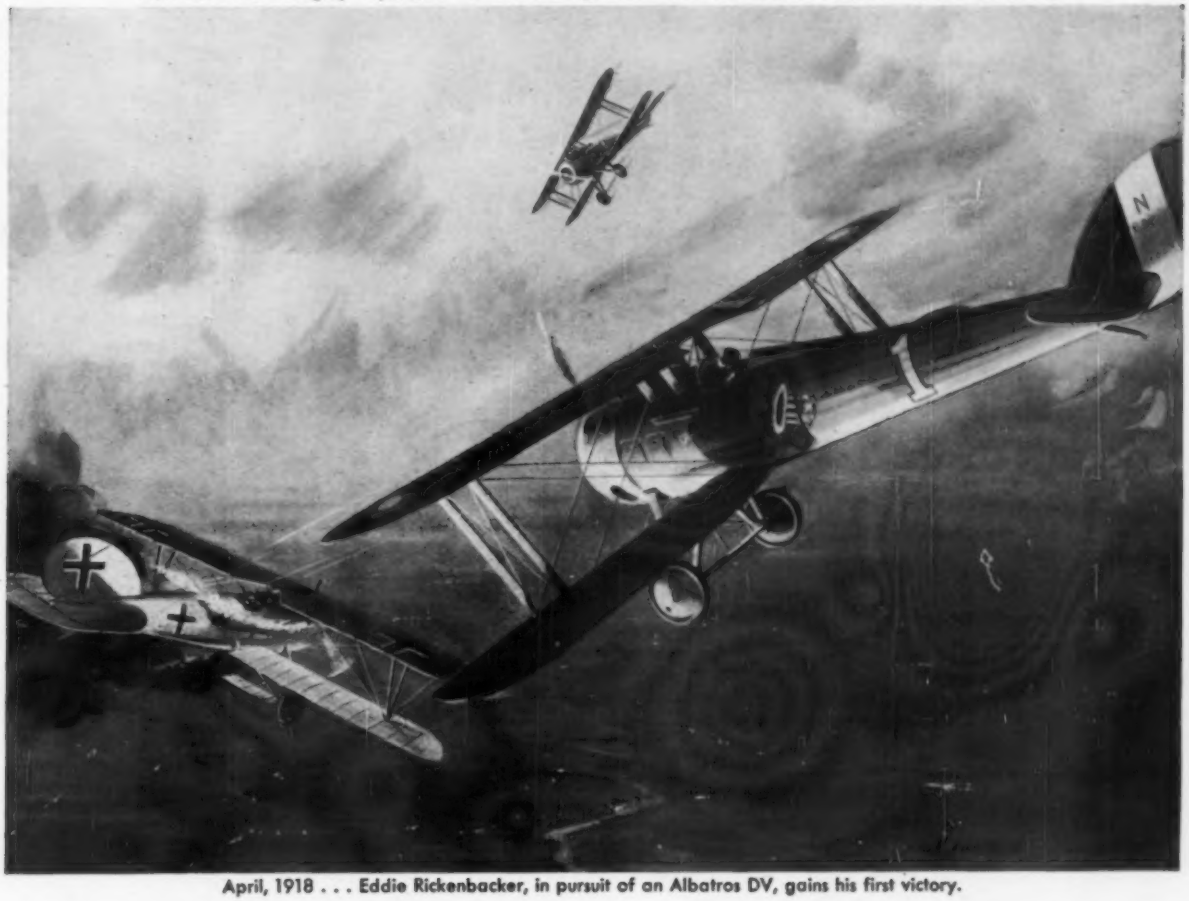

April, 1918 . . . Eddie Rickenbacker, in pursuit of an Albatros DV, gains his first victory.

Early War Birds— THE NIEUPORT 28 C.I

The last of the rotary powered Nieuport scouts used in World War I, this French plane was noted for parallel interplane struts in place of its predecessors' "V" struts, a sleek fuselage, and clean lines. The monosoupape Gnôme engine gave it good speed and climb. It was usually armed with two synchronized machine guns firing through the propeller. Endurance was slightly over two hours. Although reputed to be structurally weak, the Nieuport 28 had good flying characteristics . . . and served well for pilots aware of its limitations in a steep dive.

When U. S. pilots began arriving at the Front early in 1918, many of them got their first taste of combat in Nieuport 28's. So it was with Captain Eddie Rickenbacker —Medal of Honor winner. His first victory on April 29, 1918, is noteworthy in that it was characterized by the cool determination and skill that made him so successful.

It was nearly twilight, when Rickenbacker and Captain James Norman Hall (later to become a renowned author) encountered a lone Albatros DV. The more experienced Hall (he had previously flown with the Lafayette Escadrille) led the attack with Rickenbacker positioning himself to cut off the enemy's retreat. The German spotted Rickenbacker, and banked for him just as Hall closed from a dive and opened fire. Suddenly aware of both opponents, the German broke off and scurried for home . . . with Rickenbacker in close pursuit. Closing in, Rickenbacker opened fire and the Albatros went down.

After 6 weeks of preliminary front line flying, Eddie Rickenbacker was ready to begin his brilliant combat career. When the war was over, seven months later, he had achieved 26 accredited victories, and many more probables . . . to become the American Ace of Aces.

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(Continued from page 76)

Fulton celebration and flown from Governors Island, around the Statue of Liberty, and up to Grant's Tomb and return. A bit later Glen Curtiss had hopped all the way down the Hudson from Albany to win the New York World's prize of $10,000. Out at Sheepshead Bay, John McCurdy had sent and received wireless in flight. At the big Belmont Park international air meet, Ralph Johnstone had climbed almost 10,000 feet. The Aero Club had established a license system and already breveted five pilots—Glen Curtiss, Frank Lahm, Louis Paulhan, and Orville and Wilbur Wright.

Sperry knew these people. They weren't crackpots. They were men after his own heart. Why shouldn't his boy, Lawrence, want to be one of them—contribute something too, something they all needed? Stability! That was it! He would guide his boy in bringing stability to the airplane. What an intellectual adventure they would have together!

After months of study and experiment they arrived at what seemed an adequate design. Those months were the cradle of the air age.

Now Lawrence headed for Hammondsport and Glen Curtiss' flying school. He had to learn to fly—to become a test pilot. In a few months he received FAI pilot license No. 11, qualified on flying boats. Then came more work by the father-son partnership—adapting the gyro system to the aircraft. There was much redesigning and infinite flight testing. At last all bugs were worked out and they could announce the substance of their dream.

The Sperrys were just in time to get some of their engineering costs back. Europe was uneasy with international rumblings and all governments there were pressing hard in air affairs. The nubbin of effective flight still seemed to be the matter of aircraft stability. The French War Department set up a competition in this respect. Glen Curtiss advised the Sperrys to enter the competition. The winner of the stable airplane contest would receive 50,000 Francs—something more than 10,000 very sound dollars. The Sperrys, with their gyro-equipped Curtiss Flying Boat, embarked for France.

The picture of Lawrence cruising down the Seine before the French Army judges, standing erect in the cockpit with hands aloft while his French mechanic clambered out on the wing, became one of the most famous of photographs. That he won the contest "hands up" goes without saying.

However, the speculation that always follows such a breakthrough in technology was short-lived in this case. Before father Sperry and Lawrence could so much as get a ship homeward, World War I blazed in Europe. Britain's sea might, which had kept the peace for 100 years had lost its stabilizing power. The end of a long era was throwing its shadows. None could know that what they had seen Lawrence Sperry do along the Seine was prelude to an inconceivable change in the life of every human being. But that's what it was.

Our third article on Sperry-Rand, Giant of the Air Age, will treat of the corporation at war and in subsequent evolution of its stature and products.

BATTERY MAINTENANCE TIPS

TODAY'S increasing electrical loads demand larger generators, rugged storage batteries, and systematic battery maintenance.

Tests with Exide batteries in Cessna aircraft at Wings Field, Philadelphia, indicate that proper battery selection and maintenance more than doubles average battery life.

On planes flying after noon—Check electrolyte levels and specific gravities the first thing in the morning. Distilled or other water approved by the manufacturer is added, if needed, to bring levels up to bottom of cell filling tubes. If hydrometer shows specific gravities of cells to be at least 1.215, battery is sufficiently charged. If lower, remove battery for charging. If battery begins to flood at filler opening, reduce charge rate or stop charge. It is ready when the voltmeter reads about 14.4 volts at the terminals, on charge at three amps.

On morning-flying planes – Specific gravities and electrolyte levels are checked the previous afternoon. Water is added, if needed. If battery needs to be charged in the shop, slow-charge overnight. Battery terminal voltage is checked at three amps in the morning to be sure it is above 14.4.

Voltage regulation—Voltage regulators are checked periodically with the engine running, output measured by voltmeter. For 12-volt batteries, regulator is adjusted between 14.0 and 14.2 volts. High voltages might overheat and damage the battery. Lower voltages won't keep battery charged adequately.

Cleanliness—Batteries are kept clean by wiping them with a dry cloth. Most new light plane batteries are received either charged and filled with electrolyte or dry-charged.

Charged and wet—Check the electrolyte level. If electrolyte cannot be seen in a cell, replace with electrolyte of the same gravity as in the other cells. If hydrometer readings of one or two cells are below 1.240, give freshening charge at the recommended rate, continued, vent plugs in place, until gravity readings each hour show no increase over a three-hour period and are within the full charge gravity range of 1.265 to 1.275.

Dry-charged—Fill each cell (to the bottom of filling tube in cover) with dilute sulphuric acid of 1.250 specific gravity. Recheck levels about an hour after the first filling and add electrolyte, if needed. A freshening charge is recommended during cold weather at the manufacturer's recommended rate up to 18 hours. Terminate when the specific gravity of one cell shows no rise after four successive hourly readings. The full-charge specific gravity is between 1.265 and 1.275 with electrolyte level at the bottom of the filling tube and the electrolyte temperatures at 80 deg. F.

Use of water – If one battery is using more water than other batteries, check the voltage regulator. It may be operating above normal voltage.

Mixing – After adding water, allow it to mix with the electrolyte by leaving the battery on charge for about an hour. Then, specific gravity readings will be accurate. Mixing helps prevent possible freezing.

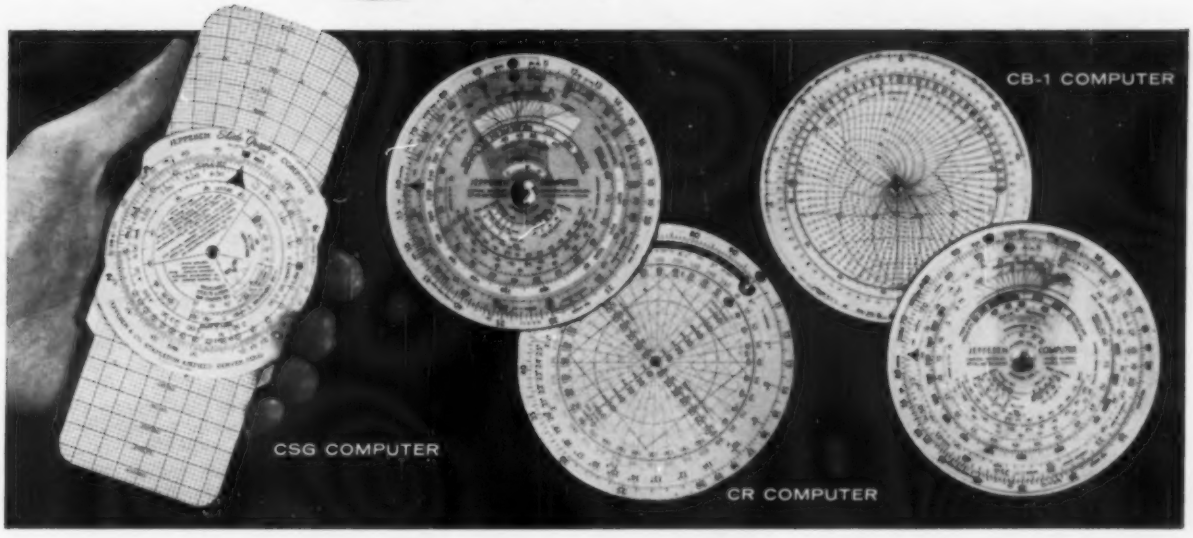
Freezing—Freezing can be avoided by keeping the battery well charged. The table shows the specific gravities and temperatures (F) at which sulphuric acid electrolyte becomes slushy (not solid):

Specific Gravities	*Slush Temperatures*
1.275	−85°
1.250	−62°
1.225	−35°
1.200	−16°
1.175	− 4°
1.150	− 5°

Idle battery—Give it a freshening charge when specific gravity falls below 1.215. It will be ready to fly without a notice and won't deteriorate.

Caution – Keep lighted cigarettes, sparks, and fire away from batteries. The gases given off by batteries are explosive if ignited.

AVIGATION AIDS FROM Jeppesen



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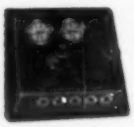

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Missiles

(Continued from page 33)

Therefore, if the target can significantly change its location in something less than 30 minutes, the probability of having destroyed it is drastically lowered.

Because of this, it would appear inevitable that an increasing percentage of strategic missiles will seek self-protection in mobility—at least until missile defenses are perfected which have an exceedingly high kill probability.

In order to destroy the enemy's mobile, moving, or imprecisely located strategic forces, we must have a hunter-killer capability *in addition* to our missiles. Until this hunter-killer operation can be performed by spacecraft, manned aircraft appear to be the only means available to us.

It seems reasonable that if general nuclear war is not to be one cataclysmic act of burning each other's citizens to cinders, we must have a manned strategic force of long-endurance aircraft capable of going into China or Russia to find and destroy their strategic forces which continued to threaten us.

Let us suppose the Russians decide to build a rail-mobile ICBM force. It is entirely feasible to employ aircraft such as the B-52 or B-70 in hunter-killer operations against Soviet railway-based missiles. If we stop thinking in terms of tremendous multi-megaton nuclear weapons and consider employing much smaller nuclear weapons which may be more appropriate for most important military targets, it would seem that the B-52 or B-70 could carry a great many small nuclear weapons.

An aircraft with a load of small nuclear weapons could very conceivably be given a mission to suppress all trains operating within a specified geographic area of Russia—provided that we had used some of our ICBMs to degrade Russia's air defenses before our bombers got there. The aircraft could be used to destroy other mobile, fleeting, and imprecisely located targets as well as the known, fixed and hardened targets which can also be destroyed by missile.

Why, then, aren't we planning a larger, more important role for manned military aircraft? Is there any other way to do the job?

Survivability of our strategic forces (Polaris, mobile and hardened Minuteman, hardened Atlas and Titan, and airborne Skybolt) means that it will take some time, perhaps weeks, to destroy a strategic force. War, under these circumstances, cannot be one massive exchange of nuclear devastation. Forces *will survive* a surprise attack, and these forces will give depth, or considerable duration, to the conflict.

THE forces which survive the initial attack must be found and destroyed. Even mobile forces must be found and destroyed. But, how does one go about the job of finding and destroying mobile forces? They are not susceptible to wholesale destruction by ballistic missile.

Some day, many years in the future, true spacecraft will be able to find and destroy mobile targets. But until we have an effective spacecraft, the answer to the hunter-killer problem is manned aircraft.

However, the aircraft which we have today are tied to large, "soft" airfields. Nuclear rockets can destroy airfields with ease. Here then is our problem: aircraft are vital to winning a war today because they can perform those missions which a missile is totally incapable of performing; but the airfield, on which the aircraft is completely dependent, is doomed by the missile. This makes today's aircraft a one-shot, or one mission, weapon. Aircraft are mighty expensive if you can use them only once.

This is the point on which so many people have written off the aircraft in favor of the missile. But remember this—it isn't the *aircraft* which is vulnerable to nuclear rockets, it is the *airfield*. Eliminate the *vulnerability of aircraft on the ground* and you have essentially eliminated its vulnerability to long-range ballistic missiles.

There are *four rather obvious ways* to reduce or eliminate the vulnerability of aircraft on the ground:

- Put aircraft in "bomb-proof" hangars when they are on the ground.
- Build long-range aircraft which can take off from small (3,000-foot) airfields with runways. If we could use all the small airfields we have in this country, we could disperse our strategic aircraft by a factor of 10 or more.
- Use nuclear propulsions to keep our long-range military aircraft in the air for the majority of their useful life.
- Using very high thrust-to-weight ratio engines, develop a vertical-takeoff-and-landing (VTOL) long-range military aircraft.

We have the technology today with which to build aircraft shelters which could withstand at least 200 psi. We could put a portion of our strategic bombers in such shelters.

Large, long-range bombers can be developed which would have the capability to take off from 3,000-foot runways, but they would require more powerful engines than we have today. There is little enthusiasm for spending money to develop more powerful engines because of the erroneous belief that the aircraft has been made obsolete by the missile.

This same preoccupation with missiles at the expense of aircraft has resulted in our half-hearted effort to develop nuclear propulsion for aircraft. One seldom hears the analogy "nuclear propulsion will do for the aircraft what it has already done for the submarine."

If, for some reason such as economy, we are not going to develop aircraft nuclear propulsion with a sense of national urgency, then we should turn our effort to developing jet engines with a thrust-to-weight ratio of 12 or 15 to one. With powerplants such as these, vertical takeoff and landing combat aircraft could be built. For example, a 12-to-one engine would power a *supersonic* VTOL fighter. With a 15-to-one engine, a supersonic aircraft weighing 300,000 pounds could rise vertically. The reason that we are not going ahead full speed to develop high thrust-to-weight engines is that it would cost perhaps a billion dollars—and you don't spend that sort of money if aircraft are obsolete.

When aircraft are no longer helpless on airfields, they are no longer vulnerable to ICBMs. If our SAC bombers were, today,

(Continued on page 82)

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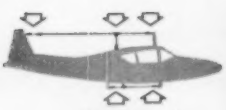

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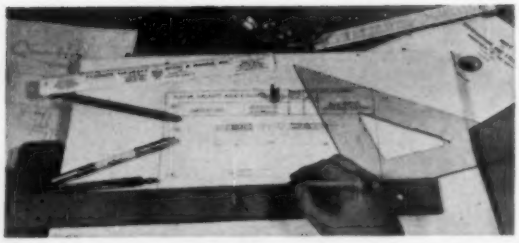

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(Continued from page 80)

capable of surviving a surprise missile attack and *because of infinite dispersion or long endurance had the capability to strike at Russia again, and again, and again,* those bombers would unquestionably assure our military dominance.

We would have the means to seek out and destroy the enemy's force—whether it were fixed or mobile. With such a force of manned bombers we could bring enormous pressure to bear on an enemy, and this pressure would be selective and extremely discriminating. No need to kill an entire city and all its people because we lacked the precision and reconnaissance to selectively disarm the enemy's military force.

Our first necessity, at the very outset of war, is post-attack reconnaissance. In a few years we will have SAMOS (semi-automatic missile observation system). But in the case of moving targets, and targets which have limited mobility, what will their location be when it is time to destroy them? What targets have we successfully knocked out? A ballistic missile cannot, today, tell you if it was successful or unsuccessful. What targets still remain to be hit? These crucial questions must be answered by post-attack reconnaissance. SAMOS will be hard put to see through clouds—and to see in the dark.

Even if this is some day possible, there remains the 30-minute time of flight of a missile to its overseas target. If the target can change its position significantly during the 30 minutes the missile is in the air on its way, the probability of the missile destroying the target is drastically reduced.

Pre-attack reconnaissance is vital but only *post*-attack reconnaissance will allow us to terminate the war favorably. It would be priceless to have an aircraft to gather that post-attack reconnaissance. It could operate under the clouds and perform infrared photography through clouds and at night.

It would be even more valuable because that same aircraft could immediately destroy any targets it discovered—no need to wait for a missile to come all the way from the United States with the chance that the target, if it were mobile, would be gone.

A large aircraft, such as the B-52 or B-70, could carry perhaps 50 or 100 small nuclear weapons. Few people realize that one kiloton of nuclear explosive power will create 1,000 psi overpressure at 100 feet. Or put another way, the hardest missile site planned today could be destroyed by placing a one-kiloton warhead (1/20th the size of those used in Hiroshima and Nagasaki) within 100 to 200 feet of the target!

It is our lack of extreme accuracy which forces the use of very large yield nuclear weapons.

Today we have side-looking radar which has such high resolution that the radar picture clearly shows individual buildings, runways, taxi-ways, separate spans of bridges, etc. With these keen "eyes" and small nuclear weapons delivered with accuracy, military forces can be directly attacked *with minimum damage to urban areas.*

If we fail to develop the means to hunt down and destroy the enemy's military

force with extreme care and precision, and if war comes in spite of our most ardent desires for peace, our choice of alternatives will be truly frightening. Let us assume that the enemy has started war by a surprise attack against our *military* forces. *He has scrupulously avoided attacking our cities and people.* This surprise attack could very well have left 10 to 20 million American casualties. Although an attack which left up to 10 per cent of our population casualties would be unprecedented and certainly catastrophic, the decision which this nation would then face would be far more frightening. These would be our alternatives:

- We could retaliate against the enemy's cities and people. But if we did, the enemy in reprisal could *raise* our casualties to 90 per cent of our population, and we would still have lost the war.
- We could reply against the enemy's military force. Yet with only a force for terror, which does not need to be large, the portion remaining after a surprise attack would be ineffective and inappropriate. It would be a mere remnant of a force which was never designed for the difficult job of destroying the enemy's military force. Again, we would lose the war.
- If we did not wish to invite the destruction of an additional 80 per cent of our population and recognized our inability to destroy the enemy's force, we could choose not to respond at all. Of course, in this case also, we would lose—but the bulk of our people would still be alive.

"Hope springs eternal" and it may be that our nation would not choose to die a futile death. If the terms for cessation advanced by the attacker were more attractive than "suicide," there is considerable reason to believe that we might elect to negotiate rather than abruptly end the life of our country and the lives of most of our people.

The conclusion that this great nation might capitulate rather than choose to die a futile death is repugnant and completely unacceptable to our citizens. Fortunately, there is an alternative to national slaughter in general nuclear war—the military must continue to develop weapons and strategies designed to defeat the enemy's military force and not merely obliterate his nation along with millions of unfortunate citizens on both sides.

ICBMs are certainly a marvel of man's inventiveness. They can contribute mightily to the defense of our nation. But let us not be blinded to their limitations.

It cannot give an account of the success or failure of its mission. It cannot provide post-attack reconnaissance. And it cannot effectively seek out and destroy mobile strategic forces of the enemy.

Those vital operations which a missile cannot do, must nonetheless be done. Victory is impossible without these missing links. Until some future space force can *effectively* perform these functions, we have no alternative but to use aircraft.

Rather than the missile replacing the aircraft, it is much more likely that spacecraft will replace the inflexible missile—with the aircraft still around to cover the shortcomings of the spacecraft—just as it is presently covering the shortcomings of the missile.

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Game Warden

(Continued from page 45)

usually because there is simply no other way to do it as well—it has been necessary to work out techniques and maneuvers not found in the books.

Actually, in order to be most useful, aerial patrol in season or out must be a very businesslike affair. Before takeoff, the assigned area is carefully plotted for check points and intended flight routes. Once aloft, the pilot is in constant contact with the several wardens on the ground with whom he is working.

In addition, nowadays, he has the capability of calling the Highway Patrol on their frequency in most states. Spotting violations, or other matters which need investigation, is so easy in an aircraft that I have kept four or five wardens in ground units busy scuttling over a strip 50 miles long and as wide as they could handle. With this snooper capability, Utah now finds its Cessna 180 and two Super Cubs a paying investment.

THESE enforcement flights are the most boring and most thoroughly disliked assignments, not so much from the flying involved as from the idea of spying on fellow sportsmen. Herding elk, however, is a different matter. Whereas the business of spotting poachers usually demands no more than precision flying at low altitudes, with an occasional brush with determined persons, moving the larger game animals by use of the aircraft alone has developed into an art. At one time of the year, it may be necessary to buzz these crafty beasts out of the protected ranch valleys in Utah so that they will become legal game for hunters. A few months later we may round them up again in the isolated mountain plateaus for counting and, in some cases, feeding.

My passenger on one of these sorties was a photographer who had been making wildlife movies in the area. First, as usually happens with persons who have done their flying in the level east, he smiled at my warning about mountain air currents, and his heavy camera case went floating around the cockpit when we struck some mild drafts. I could have told him about occasions when it was impossible to keep even sun glasses or a headset in place while the plane rode out the small mountain waves. When we finally located our quarry, they were holed up in aspen thickets at the 10,000-foot level. I pulled in behind them on the gently sloping plateau and started losing altitude.

"I'll shoot 'em as you go past," my passenger said.

"I'm not going past," I told him. "Shoot while we approach."

"Not going past? Then how. . . ?"

Just over the tops of the thickets and the rumps of the elk I horsed back on the wheel of the Cessna 180, added power, and pulled up in a short, slanting loop, and pulled out of it in about the same position behind the herd. Unfortunately for the photographer's digestion, this was the only efficient method we had found for moving these animals. It permitted us to hit them from behind, a number of times in quick succession and, by being in a banked position all the way around the maneuver, we were able to pull out easily if it became necessary.

As for not going past the herd, I had learned quickly that once the plane is flown directly over them they are no longer afraid of it, and no amount of mere buzzing will move them afterward. It is the downwash of the air stream and the sudden noise of the motor which makes them stir from places they feel are safe—and even then some elk will move only a short distance. After a few more passes, these 20-odd head retreated to some tall brush from which they would not budge, even after a half hour of firecrackers.

Easing carefully down, I dragged the landing gear through the tops of the twigs above them. Dangerous? It depends on the pilot, as in all other flying, but it is a fairly common trick employed by fish and game personnel. Frequently the lightplane and such measures are the only possible tools for this job, due to terrain, impassable snow, or distances involved. In this case an old cow elk, as it usually happened, was frightened by the racket into bolting for open country. The rest followed, and our mission was successful.

No amount of precaution can prevent accidents from occurring, here as elsewhere, but the fact that this work is being done in such conditions of hostile geography, worse turbulence, and constant demand on the aircraft, makes any mechanical malfunction or pilot error something to consider seriously. If an engine quits here, someone has a long walk—or crawl—ahead of him. Still, despite this unavoidable risk, the plane will continue to expand its uses in the field, and rightly so. It is simply too effective to be ignored, especially as experiments prove its value in services as yet unexplored.

During our first attempts at fish plants, I brought our craft, a Super Cub, in over the water at a reasonable speed in order to simulate actual conditions in the cramped valleys of Utah's mountain lakes, and dropped the trout while just off the surface. The result, obvious enough now: a large percentage of kill from the skidding impact. With the next loads we went a little higher, and a little slower, until we were approaching at 100 feet and a soft 70 mph. We found that it was possible for 90 per cent of the fingerlings, fry, and even legal sized fish to survive this drop.

THE Uinta high lakes are small and frequently walled with rocks. In any wind, you are simply not going to hit the water with the fish from an altitude traditionally considered safe. In this respect it is unlike the California ponds which can be bombed from 800 feet in a twin-engine Beech. The smaller, steep-walled places here demand that you be low enough to hit the awkward target. This puts you well below the surrounding stones, and slow enough that the fish will have ceased their forward motion by the time they smack the water. The combination, at 11,000 feet msl, in a single-engine aircraft, requires a pilot who likes the trade.

I had come homing in one morning with a tank of brook for a lovely lake in the Uintas which looked nothing like its name of Red Belly. It was typically set in the bottom of a completely round basin, which

meant that I had to start 1,000 feet above, chop the power completely, drop full flaps, and come down to a point just off the water before leveling for the short run and drop. Again a standard maneuver nowadays.

When the airspeed had sunk to a shaky 70 mph, I brought the flaps to first position and held the speed with the throttle as I tripped the first tank of trout. By then it was necessary to get out of the narrow hole—right away. I shoved forward on the throttle. It didn't budge. I shoved again, as hard as I dared, watching the oncoming pine-slashed rocks of the basin, the tachometer with its stingy 1,200 rpm. and the airspeed indicator which told me that I had neither the speed to climb out of the place nor to make the steep turns required to circle in that acre or so of confined bowl. I thought about those 600 pounds of fish, water, and tank behind me in the fuselage. Knowing then that it was either shove or be shoved, I hit the sticking throttle with the heel of my palm as hard as I could.

IT broke loose, or something broke, the throttle slammed forward to full position. The engine choked once and died! I put my arm across my forehead and held the craft just above stalling speed as we headed silently into the trees, now almost touching the cowling.

The blast of the engine brought me back to life and I realized that we had hit something, but that we were surging upward again. It felt as though this had taken forever to happen, but the engine had simply been flooded when the throttle was jammed forward and had fired again when the pistons had cleared and a normal mixture was entering. The immediate power had thrown the little plane up out of the sticks.

Checking the damage on the ground at our forward station, I found that the tail, being in a low, nearly stalled position had gone into the pines. The fabric of the horizontal stabilizer was punched full of holes. As for the ailing throttle, which had caused all the trouble and which in any normal circumstances would not have been a serious matter, a small sheet metal screw had come loose from its position in a fairing above, had dropped square into the throttle quadrant and wedged there.

The point of all this is not to tell what a hot pilot someone is, but rather to point out that here a unique method of flying has evolved from a unique demand. Usually, the pilot is a dedicated person, probably with a degree in his specialty, and aviation is not his primary interest. Otherwise, he'd quit and make twice his service salary as an airline jockey, as I did.

Much of his pay, which is only a little augmented by his duty aloft, must come in the satisfaction of knowing his job has been well done. Obviously, he's flying for the fish and game—and darned little else—but in doing so he has pioneered one of the most exacting uses for light planes. END

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NEW BEECH DEALER PROGRAM

BEECH AIRCRAFT Co. has launched a major expansion program aimed at tripling its dealer facilities. Key feature is a unique package plan providing dealers with complete sales, service and hangar facilities, available with five-year financing.

Labeled "Operation Turn Key," the project offers seven basic standardized facilities designed to meet varying dealer size requirements. The package plan includes buildings complete with furnished offices, customer lounge and showroom; a new Beechcraft demonstrator; dealer's stock of spare parts; and shop tools and equipment.

In addition, Beech provides a business plan to serve as a guide in running the dealership to help insure its success, and a five-year cost analysis. Factory advisory services in business management, financing, sales and service personnel training are also included.

The program is aimed at greatly enlarging the market for the company's products and expanding its spare parts and accessories business. Beech is setting its sights on establishment of 200 additional dealerships under the new package program.

To start a new business under this plan, a dealer needs a cash investment, including working and reserve capital, of $50,000, $75,000 or $100,000, depending on the size of facility desired. Cost of actual building construction ranges from $28,160 to $58,918.

A typical facility (above) provides a 100- by 80-foot clear span building with 1,600 square feet of space for offices, customer lounge, parts and accessory showroom. Hangar space will accommodate together one Super 18, four Bonanzas and four Debonairs. The price erected on the customer's lot is approximately $41,648. An additional $4,500 will completely furnish the layout with office equipment and furniture, display fixtures and shop tools and equipment. Cost of the demonstrator is extra. Construction costs vary with the location. Prices given are based on the estimated labor and materials costs in Topeka, Kan.

Several major steel companies worked with Beech on design, fabrication and financing for Turn Key to provide maximum economy in standardization. The buildings will be of colored metal with brick, stone and glass trim. Beech is encouraging dealers to paint a new identifying pattern of white, red and blue stripes on the roofs.

Construction time will vary from 60 to 120 days.

Helio Courier

(Continued from page 39)

belt-shoulder harnesses are standard safety provisions.

STOL aircraft, when used as such, have an extremely high accident exposure rate because of the nature of their operations (into and out of small restricted areas). Seven Couriers have thus far been demolished in crashes—one flew into the side of a mountain, another flew head on into a seawall bulkhead while landing—yet no fatalities occurred; in fact, only one minor injury has ever been reported from all Courier mishaps!

Operators in remote and confined areas were quick to recognize the advantage and potential of the STOL. To date, 140 Couriers have been delivered to all parts of the world; 37 of the aircraft have gone to South America.

The Southern Peru Copper Company is operating nine non-supercharged Couriers from a 2,600-foot airport which is 14,500 feet above sea level. In winds from calm to 15 knots with temperature near 40 degrees and a 2,500-pound gross the Courier requires a 1,000-foot roll to take off up a one and one half per cent slope. Increasing the gross to 2,700 pounds causes an additional 150-foot roll.

Not too far away, deep in the jungles of Ecuador, a Courier is operating from a 550-foot strip which is surrounded by 60-foot-high trees and at an elevation of 3,000 feet. Tropical rains frequently make the field axle deep in mud, yet the Courier comes and goes with airline regularity.

Beauty in the Courier is functional; every line reflects the inherent performance for which it was designed—STOL. It has a thick, straight, full cantilever wing denoting high lift; yet the wing section is the same semi-laminar flow NACA 23012 which was used so successfully on the

high-speed World War II P-51. With a 295-hp Lycoming, the Courier cruises at over 170 mph.

Large slotted flaps extend over 82 per cent of the wingspan. High energy air rushing through the specially formed gap between the wing and the flaps accelerates the air flow over the wing's upper surface, thus delaying separation. Add full span automatic retracting Handley Page slats to further control the upper surface air flow and you have a wing which is virtually impossible to stall. These high-lift devices almost double the wing's coefficient of lift.

Loss of lateral control at low airspeed is a major problem area of the STOL. Being outside the slipstream, the ailerons lose their effectiveness before the wing stops flying. The Courier has small ailerons, but derives excellent lateral control down into the "thirties" by using a "slat interceptor." This is a spoiler-like control, inboard of the ailerons and directly behind the leading edge slat which, when raised, neutralizes the slat action in its area, thus causing a loss of lift on that side. They, of course, work in conjunction with the ailerons.

Mr. Lynn Bollinger, president of the Helio Aircraft Corp., with FLYING's evaluation pilot and a full load of fuel, brought the gross weight of the plane to nearly 2,600 pounds.

Sea level pressure was 30.98, wind was N.W. at 15 knots, and the temperature was in the upper 40s F. Less than half the 400 feet available was required for takeoff. As full power was applied, initial climb attitude was very steep and the vertical speed exceeded 2,000 fpm. As the airspeed stabilized on 90 mph at climb power of 3,000 rpm and 26 inches mp, the vertical speed settled down to 1,250 fpm. Less than a mile after takeoff we were at 1,000 feet.

From takeoff to landing, the 12 miles between LaGuardia and Teterboro were covered in less than 10 minutes at an indicated 150 mph at 1,000 feet with 65 per cent power at 2,600 rpm and 24 inches mp.

Landing was made at Teterboro's "inner airport" with a five-mile-an-hour tail wind; the landing roll was 300 feet.

Taxiing at Teterboro brought to light one little known advantage of the crosswind landing gear with which our Courier was equipped; kicking the plane into a "crab," we literally taxied sideways with unrestricted forward vision. Normally the large nose of the Courier, perched on its sturdy conventional landing gear, would require S-ing for forward visibility.

A downwind takeoff took the major part of 300 feet. We became airborne at 40 mph indicated and climb-out again was very steep in spite of the downwind condition.

Making landing approaches in this airplane to a small restricted area is not unlike a similar approach in a helicopter—an approach angle instead of an airspeed is utilized. The angle is established at approximately 50 mph indicated and since the plane is "stall-proof," the angle of descent is controlled by the throttle. That is, if you are high and long, you reduce the power, thereby increasing the rate of

(Continued on page 88)

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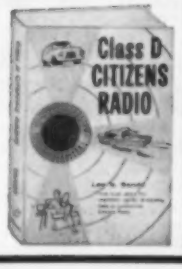

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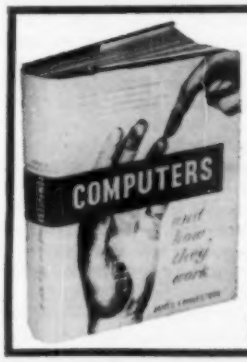

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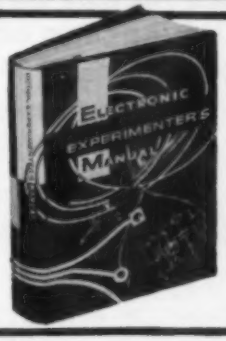

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(Continued from page 87)

descent; if you are low, power is increased, decreasing the rate of descent, thus shallowing the angle, bringing you up toward the spot. To prevent float it is important to keep the airspeed at a minimum, at least as the point of touchdown is approached.

Power definitely is required for low-speed flight: this is necessary, not only to overcome the increased induced drag of the extended slats and flaps, but to provide the necessary elevator control as well. Power off, the elevator control becomes deficient at speeds below 60 mph.

In flight, the Courier provides unparalleled safety to marginal weather VFR problems. With flaps down and slats extended (they extend automatically at 60 mph indicated and retract at 70 mph), flight attitude, when indicating between 40 and 50 mph, is level; visibility over the nose is excellent.

Steep turns of near 60 degrees of bank were executed at speeds just over 40 mph; the radius of turn was so small that at 400 feet above the surface, a change of position could not be detected from reference to ground objects.

This, of course, is invaluable when flying in restricted visibility with low ceilings at reduced airspeeds where an obstruction may suddenly loom up ahead; you just rack it around as necessary with no danger of loss of control. Just be sure to keep the power on.

Attempting power-on stalls is ridiculous. The airspeed indicator is calibrated down to 40 mph with a small area between there and zero. The plane would wallow along with the airspeed indicating down in this area and still fly. With flaps up, the minimum airspeed appeared to be approximately 33 mph. In power-off stalls, the plane pitches nose down from loss of elevator control and stabilizes at an attitude which results in a 60-mph airspeed with the elevators full up.

Landing at LaGuardia vividly portrayed the excellent slow-speed control qualities of this extremely stable airplane. At about 75 feet altitude, 100 yards out on final approach and indicating about 45 mph, we ran into the very turbulent slipstream of a departing airliner. The Courier pitched and yawed violently; the automatic slats slammed in and out, but full control was maintained. The final landing roll was approximately 150 feet.

Helio offers two production models. The Super Courier, powered by a 295-hp geared Lycoming with a three-bladed constant-speed metal propeller lists for $34,980. The standard Courier, powered by a 260-hp geared Lycoming and equipped with a two-bladed, constant-speed metal propeller lists for $31,980. The major difference between the two airplanes is in cruising speed; the Super Courier cruises at 170 mph while the standard model pokes along at a mere 160 mph. Power from the three-bladed propeller is smoother but the short field performance for the two planes is so close as to be termed identical.

Available on special order is the Super, powered with a 340-hp supercharged geared Lycoming which gives increased cruising speed and sea level STOL performance all the way up to 10,000 feet.

Coming soon, to complete the line of Helio's STOLs, is the new twin. It will add multi-engine reliability to the versatility of the Courier and is expected to make its official debut early in 1961. END

AiResearch

(Continued from page 49)

DC-6 transports for corporate and supplemental carrier use.

In the latter case, all the DC-6 aircraft will be employed for long range, non-stop flights to overseas bases. The first of the type has been delivered to Reynolds Metals for service in Europe and the Middle East. Conversions include provisions for cargo as well as passengers.

Another AiResearch specialty is conversion engineering and structural modifications for the airlines. In this category, Aviation Service Division has completed American Airlines Royal Coachman DC-7s and aircraft of Philippine, South African, East African, Hawaiian, Canadian Pacific, Hunting and World Airways. It is also subcontractor to Douglas and Boeing for jet cabin furniture.

Don Neumayer estimates that the company's greatest resource is its satisfied customers. Eighty per cent of the business is made up of repeat orders from private, corporate, military or from the manufacturers. In fact, its contract with Grumman on the Gulfstream is the only one Grumman has let outside of the immediate dealer family.

Garrett Corp. does not reveal individual unit division sales and fiscal statistics, but the Aviation Service Division's activities, when compared with others in similar business, should show a yearly gross sales of approximately $10 million. A big chunk of the business comes from pumping gasoline for scheduled airlines at the rate of 1,400,000 gallons per month and for providing ticket and passenger service to non-scheduled carriers. "AiResearch modified four airplanes in 1952, and last year the tally exceeded 48," Neumayer said. He estimates that the business increase during 1961 will be eight per cent. "It amounted to 10 per cent for the past five years," Neumayer said. He also reports that 70 per cent of the Division's business is modification work for commercial applications, of which 50 per cent is corporate. Another 20 per cent of the annual income comes from military modifications and services. Majority of military conversions have been Convair C-121 interiors.

The company also maintains and services aircraft for the Ballistic Missile Division, USAF, located in Los Angeles. In fact, it won an Air Force Flight safety trophy last year for its operational support of the USAF division.

High level of craftsmanship and skills of the division's 650 employees won many laurels and awards for its customers. Reading Air Service operations and maintenance conferences have spotlighted AiResearch interiors with national prizes each year. Last year's Flagship of Business Fleet of the Year carried the AiResearch label. END

Weather Bureau

(Continued from page 55)

lying there soggy and sluggish? By projecting this trend onto the latest map, keeping in mind the two important controlling factors of geography and season of the year, it is possible to discover what sort of air mass is influencing the weather along your proposed flight path and to anticipate the conditions there.

The resulting personal evaluation of conditions can be checked against prognosis (prog) charts, a series of small-scale facsimile maps which forecast precipitation areas, movement of surface fronts and upper air flow.

Fresh surface synoptic charts are prepared every six hours and are transmitted at four and 10 o'clock in the morning and again at four and 10 p.m., Central Standard Time. Figure 1 diagrams approximate time at which various weather information is received in the office.

Step two: the area and regional forecasts. At first sight the abbreviated jargon which pours out of the teletypes is enough to make you wonder if the machines have slipped a cog. However, much time on teletype circuits is saved by shortening words and eliminating syllables, and even the beginner will find it possible to puzzle out most words and phrases. Each station has a manual on the contractions in use which makes it easy to look up such things as "SNRS" (sunrise) and "WPLTO" (Western Plateau).

As there are important differences between regional and area forecasts, both types should be checked. The regional forecast extends over a wide section of country (Figure 2). Practically all the terrain west of the continental divide is included in one regional forecast prepared by the San Francisco forecast center. New Orleans handles the bulk of the Midwest and all Gulf coast states. Offices in Chicago and Washington, D. C. split the northeastern area. This type of forecast discusses the weather in broad terms. It gives a brief description of pressure systems, fronts and major critical areas for the next 24 hours.

MAJOR difference in the area forecast is revealed in its definition as a coverage of weather elements in "detail." Then too, the square miles allotted to one area forecast is quite small when compared to the regional forecasts. For instance, Texas is divided among three area forecast centers—El Paso, Fort Worth, and San Antonio.

Area forecasts follow a standardized format of several sections: clouds and weather, turbulence, icing; and this is followed by an "outlook." Such significant items as ceilings, visibilities, cloud tops, freezing level and precipitation are found in the first section. Turbulence and icing conditions are expressed in terms of severe, moderate, and light. The forecast covers 12 hours and the weather outlook extends 12 hours beyond the forecast period and is merely an estimate of changes or conditions which may occur.

Both regional and area forecasts come at six-hour intervals from the four regional centers and about two dozen area forecast centers.

If unexpected weather changes take place, the forecast is not generally revised. However, important items are put on the teletype, and these are often the subject of "flash advisories," which are broadcast along the airways.

Taking down quick notes while moving through these various steps will make for easier reference later on. The reverse side of the FAA flight plan form makes a fairly convenient scratch sheet and can be carried along on the flight.

Up to this point we have been dealing in generalities and large chunks of airspace. Therefore, try to answer a few general questions before moving on to weather at specific airports. Is there any trend in the weather? If the trend is down, or getting worse, is there a direction in which you can turn to find an area of good weather? Some evaluation here can prevent uncertainty during the flight when such information might be urgently needed.

Step three: the sequence reports. Very often the hourly sequence reports become the final hinge upon which a flight decision is based. However, to offset any feeling of complete dependence on them it is necessary to consider their weaknesses.

In a fast-moving or changing situation the value of a particular report fades rapidly and the teletype circuits are usually unable to handle all the "special" sequences as the changes occur. Hence, an

(Continued on page 90)

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AirCoupe

Division of AIR PRODUCTS CORPORATION,
MUNICIPAL AIRPORT, CARLSBAD, NEW MEXICO

(Continued from page 89)

examination of the weather map and area forecast provides a good defense against the danger of staking everything on a single sequence report which promises adequate flying weather.

Where ceiling and visibility are variable or slowly changing, the trend is often exposed by checking previous sequence reports. Have scattered clouds thickened to broken or overcast? Past reports give a clue. The remarks at the end of the report are also a source of useful information.

Although the sequences are so compressed that every item is of interest to the pilot, certain situations may place more emphasis on a single element of the report. For example, when visibility is lowering in haze or fog, the spread between the temperature and dew point is of special concern.

In good weather it may be enough to check only the destination and perhaps one station along the route. However, as the weather deteriorates, more stations should be checked, including a generous selection on either side of the route. Where the flight path is towards bad weather, check various stations *beyond* the destination. Weather is continually changing and moving. What one station reports will soon be reported by other stations.

Step four: the terminal forecasts. These apply to specific airports and are usually prepared for any airport which issues an hourly sequence report. The terminal forecast, however, is issued by the same forecast center which prepares the area forecast and not by personnel at the airport. Thus, if the forecast goes sour, the people at the airport weather office are not to blame.

Like the sequence reports, the terminal forecasts are compressed into a few symbols and figures, but unlike the sequences, they tell what to expect upon arrival at destination, not what the weather is now, at the time of briefing.

This obvious difference is not always appreciated. There is a strong temptation to file and fly on the strength of a sequence report giving above minimum weather at destination while ignoring the gloomy warnings of the forecast or hoping it may be wrong. Too often it is a false hope and the VFR pilot meets conditions which force him to either make the 180-degree turn or try to sneak under the weather. The latter choice, disregarding whether or not the below minimum weather was correctly forecast, has proved dangerous enough to be labeled one of the major causes of general aviation accidents.

AFTER reading en route and destination terminal forecasts, refer back briefly to the ceiling and visibilities given in the area forecast and compare them to the terminal forecast. Differences are usually caused by local terrain features or geographic position with respect to lakes, rivers, or sea coasts. Without local knowledge it is best to be conservative. Accept the forecast with the worst weather and use it for planning.

Terminal forecasts fall into two classes —the 12-hour and the 24-hour forecast. Major air ports are given the 24-hour treatment; however, both types are issued at six-hour intervals.

Step five: the winds aloft. Information on the winds aloft can be obtained from a chart, a coded numerical report, or a coded forecast. For a quick, visual picture the charts are superior, but they are only issued for two, five, eight and 14 thousand feet. The coded winds aloft reports give direction and velocity for each thousand-foot level up to 10,000 feet.

Except for overseas flights, it is not worthwhile to worry too much about exact direction or velocity of winds aloft. It is really enough to be able to plan in general terms, such as west at five to 10 knots or northeast 15 to 20 knots. In written examinations these factors are presented in fine detail and consequently require exact answers, but the combination of radio navigation and pilotage in common use today does not require such precise calculation for a flight.

If you accept this philosophy, the forecast winds aloft will provide a satisfactory source and are are frequently more accurate in general direction and velocity than the actual winds aloft reports. Again, this is due to the constant change and movement of weather, which technically makes even a sequence report hot off the teletype nothing more than history.

Step six: pilot reports (PIREPS). Pilot reports sometimes offer the possibility of checking actual against forecast weather. A pilot may report cloud tops at 5,000

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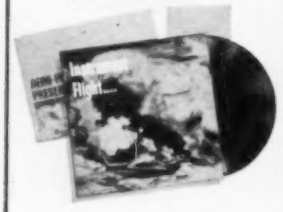

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feet when the forecast called for tops at 10,000 feet, or he may report rain when none was forecast. Discrepancies such as these are not in themselves enough to discredit the complete forecast; cloud tops can vary in height over a wide area, and it is quite common for rainfall to be scattered in pockets. The value of being able to compare lies in the additional opportunity to evaluate the trend of the weather.

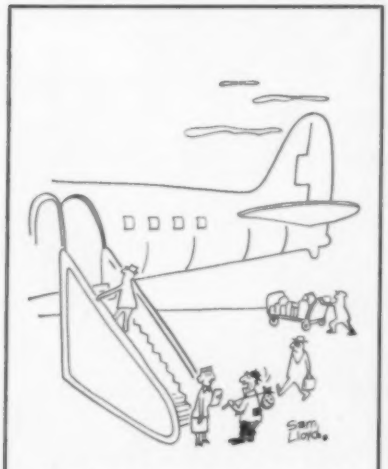
There is, of course, another side to the coin. More often than not a PIREP will serve to confirm the accuracy of the forecast. For a pilot planning a flight this is even better news than that of weather which is different from the forecast.

Personal preference or experience may dictate the addition of steps to this list, or possibly the elimination of some, but here, in quick summary, is the weather office "menu": surface synoptic and prognostic charts; regional and area forecasts; sequence reports; terminal forecasts; winds aloft; PIREPS.

Following the exact order outlined above is not a mandatory requirement for obtaining a satisfactory weather briefing. It does offer advantages for the pilot who may be unsure of his routine in the weather office. It is a cumulative process. Each separate step adds a small piece to the weather picture and it is added in logical order.

The primary object is to obtain a decision on whether to go or stay on the ground, or perhaps on how far to fly before a landing becomes necessary. Whatever the decision, it must be a personal one. The weatherman cannot decide for you. He may offer an opinion, but any assistance does not imply a responsibility to say "yes" or "no" to a proposed trip.

Extreme situations are the only ones which allow a quick, clear-cut decision. On one end of the scale are CAVU conditions from "here to thar' and beyond." At the other end are the conditions which halt airline traffic. Under either of these circumstances the decision is easy. As the weather shifts away from the extremes, however, the decision is more difficult, and it takes longer to make best use of the weather office menu. END



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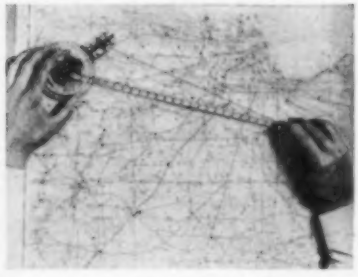

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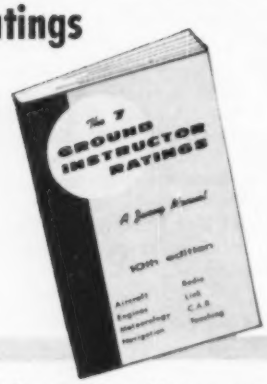

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THE THRUST LEVER

By CAPTAIN DAVE KUHN

NOISE ABATEMENT is a fancy term applied to a program that is aimed at developing techniques in flying which will prevent airplanes from making noise. It is not easy to implement.

Jets create a terrific amount of noise. Even at idle thrust, the ground personnel at an airport have to wear ear-plugs or ear muffs. Anyone having stood near a jet takeoff will concur that one such experience is enough.

Quite a number of procedures are being employed (some frantic, some logical) to reduce the noise. Pilots have suggested some of them while being victimized by others.

On approaches, for instance, by staying above the glide path at high approach speed in a clean configuration, little if any power, above idle, is needed. Landing long on the runway helps. In traffic patterns, most pilots are staying above 2,500 feet to lessen the blast. While these things reduce the noise in approaches, the takeoff is the real bugaboo.

Most airports having "airport neighbors" have certain departure patterns that help. Usually these are over water (Los Angeles, New York, Washington, etc.). The runway used is called a "preferential." At Chicago's O'Hare, turns "as soon as practical" are made to avoid flying over the most populated areas. The preferential runway is not always the one preferred by the pilot. There may be a wind component on the tail or a strong crosswind which would normally dictate preference for another runway. However, in the interest of aiding in the program, most pilots use the runway assigned with winds up to 10 knots on the tail and not more than 30 from the side. This may, in some cases, necessitate removal of payload or fuel.

Now here is where a conflict of interest develops. If a pilot elects to use a runway other than the preferential, for reasons of safety, he must write a letter explaining his action.

At Idlewild, the New York Port Authority, in addition to the FAA, is in the act. Their noise abatement rules exceed those imposed by the FAA—truly a double jeopardy for the pilot. The Authority now has Delta in court to determine if the airline can comply with the rules. Night operations are curtailed between 10 p.m. and 7 a.m. They demand use of preferential runways with stronger tail winds than does the FAA.

There was some question, at first, as to whether the Port Authority would allow jets to operate in the area. Restrictions such as the following may force them out yet: On takeoffs toward houses, pilots are supposed to execute a trick procedure. There is a "countdown" by a ground operator. At about 500 feet altitude on the count of the ground man, the pilot is required to reduce his power and "climb out immediately to 2,000 feet."

While straining for altitude and speed, with a fully loaded jet destined for Europe, most pilots would like to witness a demonstration of this feat—from the ground. It hasn't happened yet but, with reduced power, airspeed 10 knots above spin-in, nose high and heavy load, the loss of an outboard engine is bound to damage composure.

Certainly this type of takeoff is inconsistent with all the rules of safe flying. It is a tribute to the dependability of fine jet engines; however, there is a limit to how much a pilot should be asked to do in reducing noise.

Old-time pilots remember when most airports were clear out in the "boondocks." Gradually, through subdivision and the selling of "view" lots, most airports now are victims of tightly packed homes and buildings that fairly picket the traffic patterns. Oil and pieces of airplanes dropping on the citizens below have resulted in damage suits against the airlines. O'Hare Field only a few years ago was out in the country. Now Elk Grove Village is in direct line with the new jet Runway 32. There are complaints.

Sound suppressors on the jet engines can help some. But they are expensive to maintain and rob the engine of thrust. More fuel must be carried on a long haul. The extra 500 gallons of fuel required on a coast-to-coast hop is the equivalent in weight to 13 paying customers. With the industry only partially converted to jet operations, it has been estimated that sound suppressors are costing the airlines over $16 million each year. That would buy lots of ear plugs.

There is no way to get away from it. It takes lots of power to get a 300,000-pound airplane off the ground. Noise is a by-product of that power. There are these mentioned procedures, and perhaps others, that will lessen the noise but nothing can eliminate it all.

Proper zoning may be a bit late. People with sensitive ears will move away from airports. Others will get used to the noise. Noise abatement procedures can do quite a bit to give relief, if all concerned will continue to practice them. There will always be noise. And the airplane is here to stay.

Electra

(Continued from page 47)

These accidents, as explained by engineers after exhaustive tests by Lockheed (which ran about $2,500,000), were caused by:

"A unique coupling of forces and reactions without precedent in aviation technical history. The coincidence of three basic elements at the same time were: speed in excess of 400 miles per hour; previous damage to an engine mount strut; and the existence of a critical rhythmic resonant response in the structure, which could easily be developed by gusts or rough air."

Wobble or gyrations of powerplant, further weakening of nacelle framework, transmission of accelerated engine-propeller oscillation to the wing structure, combined to tear the wing from the plane. American's Vice President William Littlewood said, "No airplane could have fought back against such a savage onslaught."

- Number four accident involved an Electra striking a new construction dike and turning over during a landing at New York's LaGuardia Airport. All passengers and crew walked away.
- The fifth accident in the string occurred 24 seconds following initial takeoff roll from Boston airport, when an Electra plowed into an enormous cloud of starlings and crashed in the water. Sixty-two persons died and 10 survived. FAA reported that impact of the birds and engine ingestion resulted in loss of power and speed during the climb-out.

The East River, LaGuardia dike and Boston incidents are rightfully classed as accidents which can happen to any airplane, and ones in which structural integrity or design of the airplane is not involved.

Elwood Quesada, head of the Federal Aviation Agency, airline operators and Lockheed Aircraft concurred—decided it was safe to operate Electras at reduced speed until the cause of the Tell City and Buffalo accidents could be pinpointed and the engineering fix defined. It was reasoned that whatever the details of the conditions encountered—described as a "whirl mode"—they could not be encountered at the lower maximum speed of 225 knots (259 mph) as compared to normal cruise of 280 knots (323 mph) indicated at 15,000 feet.

AFTER the Tell City accident, Lockheed verified the "culprit." Trouble did spring from a previously damaged engine mount strut. The investigation involved well over a million dollars and the time of numerous government, airline and other industry experts.

It was also estimated that around $25,000,000, FAA certification of the modifications to wings and nacelle, and many months of factory re-work had to be accomplished before the speed restriction could be removed.

In the meantime a "whispering campaign" developed. Despite assurances from operators, the FAA and the factory that the Electra was a completely structurally safe airplane within the speed range allowed, rumor mongers and gossip pipelines began to work overtime.

American reported passenger traffic on Electras down approximately 10 per cent. Other airlines were hurting, too, especially in previous crash neighborhoods.

American reported that Electra direct operating costs were 25 per cent higher, due to the longer flight time and rescheduling problems; increased monthly operating costs have been placed unofficially at $350,000. Running time between Chicago to New York, normally about two hours and 32 minutes (westbound) and two hours, five minutes, (eastbound) was extended by 18 minutes and seven minutes, respectively, during a measured three-day operation.

As unfavorable public reaction began to build up against the Electra, and some airlines removed the name from ads—new names were promoted. In Braniff's case the Electra's Lockheed project number is used —L188. Eastern placed more and more emphasis upon the "Golden Falcon Service."

Some airline managements seemed displeased at the very mention of the word "Electra." They believed the less said about the situation, the better. In effect, they would say, "stop talking and it will go away."

American airlines put the facts straight and clear. Its management from C. R. Smith down, obviously believe that nothing can be gained by hiding their heads in the

(Continued on page 94)

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(Continued from page 93)

sand and waiting for the whole mess to blow over. Sales, public relations and operations teams have been sent into the field to brief personnel, inform the press, the customer and the public of the facts. They are called Electra fact teams and the results are beginning to produce important public relations dividends.

The Boston crash occurred on October 4th—the floodgates of emotional reaction burst open. Some passengers failed to make their planes. Others suffered anxiety as they boarded Electras. Elwood Quesada pitched in again, stating that preliminary investigations indicated the crash was caused by the plane striking an unusually large flock of birds just a few seconds after takeoff. Congressional voices again cried "ground the plane." Quesada was accused of trifling with the public interest and human lives by permitting Electras to fly at restricted speed.

TO complicate the public's view, the day Braniff officials and pilots were telling Congressman John Bell Williams' (D.-Miss.) Subcommittee on Transportation and Aeronautics about the company's confidence in the Electra airplane, its insurance underwriters filed a $4,500,000 suit in the name of the company against Lockheed for design negligence. This is considered "commonplace or routine" within the industry, but it seems pretty unsettling to the average air traveler.

Traffic sales chiefs throughout America's system were deluged with questions. As mentioned, business fell off and the bulk of it came from old-line air traveling company executives who use airlines the way Main Street merchants used to ride streetcars.

American's management called a meeting of all Electra operators—the seven domestic companies. Discussion ran the gamut from "let's do nothing" to the full-blown frontal approach suggested by American. C. R. Smith offered the plan to other lines and asked for support of American's program. All airlines admitted they were hurting saleswise, but American's plan seemed too aggressive for some.

Western Airlines planned to follow the American route and Braniff, Eastern and National offered to support AA's mission with pilot and other personnel as required.

A statement of AA's operating philosophy in the form of a letter signed by C. R. Smith, launched the Electra fact team project. It forcefully underscored the simple logic that American would not continue to fly any airplane if that plane were unsafe. Smith said, "Obviously, the good reputation of American Airlines is more valuable than the property rights in a fleet of airplanes. If we believed the Electra to be unsafe, we would ground it."

Statements by Capt. Thornton Wagner, AA engineering test pilot, accompanied the president's letter, which reached regular industrial accounts, special friends of American, the press and other influential groups. Thornton documented the plane's record and its reputation among pilots as a safe, rugged airliner.

Eastern airline's President Malcolm A. MacIntyre sent similar statements to regular customers.

The first of five AA Electra fact teams took to the road November 1st. Its high level brass touched base with important groups in New York, Chicago and Washington, D. C. Team members included research Vice President William Littlewood, Capt. Arthur Weidman, 17-year veteran with AA, and Willis Player, vice president, public relations. Support from other airlines included Capt. Warren Schultz of Northwest Airlines and Capt. Jack Isbill of National.

Team targets were not just the press and special customers but the line's personnel and other airline sales and operating staffs. Congressional and governmental groups were accorded special briefings. Question-and-answer sessions provided a welcomed outlet for items of concern to passengers.

Of the 26 cities served by Electras, 18 were covered by the five teams. The program delivered many side benefits in addition to clearing the air on the Electra story. It brought American closer to the passenger and fortified its personnel with confidence producing answers to questions on which they, themselves, may have nursed secret concern.

News media, some of which had printed pretty garbled accounts of past Electra—and other aviation—incidents, responded most favorably to the straight-talk approach of American. Newspaper reports, columnist comments, radio and TV features—all helped to explain the peculiar set of circumstances which led to the Tell City and Buffalo accidents, defined the New York, East River and LaGuardia dike incidents and the Boston tragedy as situations not involving the structural integrity of the airplane.

Most importantly, they reminded the public and aviation people, too, that the Electra isn't the first new airplane to encounter new and unpredictable circumstances, that in its present flight speed range it is completely safe and reliable—more so than many other "old reliables" still flying today.

From personal investigation of press reaction to AA's fact team program, writers have high praise for its willingness to face the issue.

Richard Starnes, Scripps-Howard columnist, writing "In Defense of the Electra" said, "The Electra, of course, is fair game for every self-styled expert in air transport, including timorous grannies who wouldn't fly anything swifter than a rocking chair, and airborne tosspots who commonly think they are flying in a hangover . . . noisy critics of the Electra immediately applied blowtorches to the big bird's tailfeathers.

THE Connie and the great Douglas airplanes all went through painful evolution, and they ultimately turned in tremendous records of safe, economical air transport. The Electra is going to do the same thing, in my book, if the calamity howlers and windy politicians will let it alone."

American's straight-talk public relations program began to draw admiration and support from many quarters. One unexpected and helpful boost came from one all-time champion for air, Arthur Godfrey.

Godfrey was making a trip to Dallas on behalf of the African Research Foundation but when met at the plane by the press,

he was asked about the Electra. He said, "Get it out of your head that there's anything wrong with the Lockheed Electra." He described the plane's attributes, its structural strength and advised, ". . . so take it from me, and I do know something about flying, do not hesitate to ride a Lockheed Electra any time it's available."

Hearing of this unsolicited testimony, American asked Godfrey if he wished to fly the airplane. And in exchange for that opportunity Godfrey contributed his time and name to a short black-and-white film which is now being used by all airlines for public non-revenue showing.

Spectators and professional airmen at crowded Idlewild and Washington National airport terminals were startled by the sight of a blonde pony tail waving from an AA Electra cockpit one beautiful November day. The curious soon discovered that the nation's only woman pilot to pass NASA's astronaut tests, Jerrie Cobb, was flying the Electra on a four-hour evaluation flight. She put the bird through stalls, variable takeoff and landing conditions, cut engines at critical points in takeoff and in flight and "found the Electra has less complications and is easier to fly than four-motor reciprocating-engined planes."

Jerrie has flown four-engined equipment and, of course, flies daily with Aero Commander Inc. at Bethany, Okla., where she is advertising and sales promotion manager. She has flown twin-engined Commanders across the Atlantic and holds many flight records.

After her flight she said, "I found the Electra far exceeds normal safety requirements in all categories." Then she frowned. "It makes me mad to see such a darn good airplane criticized so unjustly by intelligent people. It's hard to believe that intelligent American people have refused to book passage on Electra flights and condemn it without finding out the true facts."

From the woman's point of view, she added, "If the Electra is simple enough for a woman—who has never flown a turboprop before—to fly through a strenuous evaluation flight test, then it's safe enough for passengers to ride with Electra-experienced million-mile airline crews."

Suffice it to say that Electra pilots agree with Jerrie Cobb that the plane is truly a "pilot's airplane." Every man assigned to the craft likes it: the wonderful surge of power at takeoff, the light, easy feel of the controls, the comfort and flexibility in varied configurations for short hops or long jaunts. The waiting list for seniority assignments to Electras is long and documentary of the veteran pilot's preference.

FLYING checked members of Air Line Pilots Association, Air Transport Association and others. All expressed organization and member confidence in the airplane. Unofficially, they believe the straight-forward approach to the problem will prove beneficial to the whole industry.

Admittedly it's difficult to make some aviation people remember that true airspeed (TAS) varies from indicated airspeed with change of altitude and temperature. Consequently, it's asking too much to expect the passenger to figure this out for himself. But, herein lies one of the sticklers in passenger understanding of the Electra situation:

Electra "restricted" speed is redlined at 225 knots indicated airspeed. Under standard conditions that is 281 knots or 325 mph TAS at 15,000 feet. At 24,000 feet the airspeed indicator shows 225 knots, but the corrected speeds are 322 knots or 370 mph. The average passenger may feel that, if speed figures are so conflicting, perhaps it would be better to stay out of the plane until the whole trouble is fixed.

American's Electra fact team helps explain the story in a simple but confidence-building manner. The fact that airline people are ready and willing to take the time and trouble to inform the public in itself instills a great deal of confidence and helps wipe away fear.

The Electras are being structurally modified. Planes started rolling down the Lockheed modification line last November. By the summer of 1961 the domestic airline requirements are expected to be satisfied. For scheduling reasons most companies will not restore the turboprop to their 400-mph-plus cruising speed until all fleet aircraft have been reworked.

The industry has demonstrated a new philosophy—that of tackling rough problems instead of hiding its head and hoping the curse would go away. Public relations has shown its mettle, too. And the airlines are restoring confidence in the Electra.

Lockheed intends to market the plane and is convinced new sales will be consummated as FAA certification is finalized and the modified aircraft are re-winning confidence and traffic support. END

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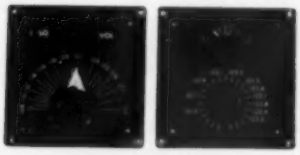

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I Learned About Flying

(Continued from page 62)

railroad that would come from the northwest. I could then follow it right into Rhinelander.

Scattered snow showers began to appear. My thermometer registered 32 degrees as I eased apprehensively into the first band of snow and watched soggy snow flakes create little explosions as they struck the leading edges, and turn immediately to ice. Minutes later I broke out, and slowly, grudgingly, the ice melted and fell away. Here was a lot more weather than I had bargained for, and I decided to stop at Rhinelander to re-examine the weather south. Where was that railroad?

The thin dark line began to show itself on the monotonous white surface. With a sigh of relief I straddled that lonely track and began riding the iron beam. I hadn't been at it an hour and I felt as though I'd been fighting the weather twice that long. The sun holds short reign that time of year, so there couldn't be more than two or three more hours of daylight left. But you could hardly call it daylight; visibility was down to a ragged mile.

SUDDENLY a flash of light appeared to my right—then again. It was the Rhinelander beacon! I was careful not to drift east. There were towers to the east and they are hard enough to spot with unlimited visibility. Snow began to fall again as I swung onto my downwind leg. I watched the snow graders on the runways as they interrupted their endless struggles to make room for my lonely PA-12.

It was good to be on the ground. We'd made it this far, I congratulated myself, and what a welcome rest for tired eyes and taut nerves. The next hop would be a short 50 miles to Wausau. However, the possibility of icing continued to bother me. Then suddenly it occurred to me that there might be a cooling trend as the sun set. If so, there would be less danger of icing up and a bigger spread between temperature and dew point. I decided to wait till the last possible minute that would allow me time to reach Wausau before dark. I was still determined to be in the office the next morning.

No change! The cloud layer was too thick to allow any heat loss, and I trotted to the plane in low spirits. My preflight examination uncovered another very discouraging thing. Moisture had formed over all the top surfaces of the plane and frozen in beads of ice. They were impossible to remove. This looked like the end of the trip, but since it wasn't a solid, overall layer of frost I decided to flight test the ship before giving up. The bird climbed encouragingly with no apparent loss of lift, but as I leveled off I discovered a bad flight characteristic caused by the beads of ice. My normally stable airplane wanted to bank to the left, but I found that with a little knee pressure on the stick I was able to hold her steady. There seemed to be no loss of air speed.

In the air I was even more intent on continuing. This proved to be a poor decision for two reasons: first, because due to the lost time I would be over the wilderness and beyond radio aid when the sun set; second, because that left wing triggered the worst scare I've ever had. There were no towns along my route until I was close enough to pick up the Wausau omni.

Nothing but snowbound lakes and forest slid through my meager two-mile circle of visibility. Mile after mile went by with no check points and only a by-guess-and-by-gosh correction for drift.

Slowly and ominously, the light began to fade and my attention became more and more concentrated within the cockpit. The landscape slipped through the gray scale and plunged into black as the unseen sun dropped below an invisible horizon. I waited eagerly for a reliable radio signal to reach out to me through the frightening gloom. Suddenly the lights of Merrill danced into view and the omni needle began to flutter. My ego soared again. I broke the monotony for the Wausau radio operator and happily complied as he requested sky information. I had it made; the worst was over, and I'd be flying over comparatively inhabited country from there on.

My next stop would be Madison, 130 miles to the south. I had a good 400 feet of ceiling when I came into Wausau, and with a little luck I could probably get a controlled approach into Truax Field at Madison. A weather check showed a slightly higher ceiling—400 to 500 feet—but, with still the same small spread between temperature and dew point. There was a low pressure trough between Wausau and Madison, and the wind was light and very erratic. The trough would be a Quonset hut type structure and I was told it should be interesting. It proved to be *very* interesting. Greatly encouraged by this information, I filed a careful VFR flight plan into Truax, figuring on riding the low frequency "on course" beam in until I could pick up the omni signal.

The Piper climbed into the black sky over Wausau and I turned to my new course, tracking out on the omni. By the time I was out of its range I had established a good heading and my check points were coming up right on the dot.

The more tired I became, the more aggravating was the correction needed to hold that left wing up. Except for that, I could relax a bit. The ceiling was up over 400 feet then, and I had about two miles of visibility. Madison's radio range signal was plainly audible. I was in the "N" quadrant as expected. In ten minutes I should clip on course and track in; nothing could be simpler.

Suddenly the ceiling lifted. So this was the trough! I could see the other side about 10 miles away, and the ceiling was way up. Instinctively I edged up a couple hundred feet in the Quonset hut of the trough. This hadn't been so tough. If I had been "chicken," I'd still be hanging around Ironwood.

THERE came my next checkpoint, and it should have been Portage, but it didn't seem just right, even though I was getting the proper quadrant signal. Suddenly I received the on course signal, which proved that unless they had moved the town, that couldn't be Portage! I grabbed for my maps and turned to follow the on course beam while looking for a good check point. All the towers were in the wrong places. Just where was I? The other side of the trough

was coming up fast. I started a slow descent riding the on course and checking charts, trying to find out.

It was like having a frosted fish bowl slammed over my head! I was in cloud! Frantically I fought through the tangle of calculators, maps, and publications for a look at the panel. The needle slammed against the stop. The ball was glued to the opposite side. A spin! The altimeter unwound wildly as the airspeed built up. It was the thought of plowing into the countryside that shocked me into action.

I broke the spin, but snapped right into a whip stall. Nose down—too late! As my airspeed built up again, I hauled back on the stick and almost went into another stall, but this time I got there ahead of the plane. The sharp climbs and dives became less violent. However, I was still over-controlling badly. I had to get out of this red and green terror. First of all, what direction was "out"? I settled for due north, and I was all over the sky trying to hold north. Thinking became a tremendous effort. Minutes dragged by—would I ever get back into the trough? Then finally I broke out, but the trough was disappearing quickly.

I turned toward some lights to the west, which proved to be the lights of Portage. A quick check of my charts showed two airports, both without lights. I chose the one with two runways as probably easier to locate on that snow-covered ground. I made four *very* low passes over the town before spotting the vague "X" of the runways. One quick sweep to find the more frequently used runway and I was on final.

I COULDN'T believe I was on the ground. I hadn't even felt the touchdown. I was surprised to find the Portage police on hand to greet me. They said they had been alerted by numerous chimney-conscious citizens. They helped hangar the tired bird and drove me to a hotel.

When I cancelled my flight plan with Madison Radio some 55 minutes late, I was told they were about to start looking for me.

Next morning the police drove me to the airport. There was still over one-quarter inch of glaze ice on all the leading edges, which proved to me that the nightmare had actually happened. An uneventful daylight flight brought me home.

Two things I am sure of now: I'll never again weigh my life in the balance to satisfy stubbornness, or fly with pride as my copilot. The Lord got me out of that one; may He give *you* the good sense to avoid it entirely. END

Horlick-Racine

(Continued from page 51)

the perimeter of the field for hours so the radar operators could zero in.

"Now they can take you right to the edge of the field over the southeast-northwest runway," he maintains.

Like the longer, hard-surfaced runways and lighting system, the unicom used for communication at Horlick-Racine is a re-

(Continued on page 98)

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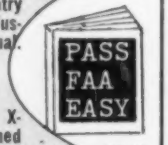

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(Continued from page 97)

sult of a gradual improvement schedule. Next on the agenda is acquisition of more land to the north for longer landing strips.

Yet there is no secret Genii providing the wherewithal. Gasoline, oil, and maintenance is competitive with or less than that of other airports in the vicinity. To top it off, no landing fees are charged, and hangar rental is unbelievably reasonable—$15 to $85 per month, depending on the size of the craft and hangar space used, or $1.50 per night for transients. These rates are $50 to $75 less than Milwaukee fees per month for multi-engine aircraft.

IN ADDITION to the six T-hangars, and a 60 by 110-foot metal-clad hangar, Sullivan leases property to two of the stockholding firms. Johnson Air Interests, Inc., a subsidiary of the S. C. Johnson and Son, Inc., manufacturers of Johnson's Wax, has a modern 100 by 140-foot hangar and Walker Manufacturing an 85 by 100-foot hangar, both on property leased on a long term basis.

These are the airport's only sources of revenue. Unlike other private fields, no passenger flights are allowed, nor is there any instruction. The field is maintained strictly for executive aircraft.

The owners report that 95 per cent of flights logged in or out of the field are by executives engaged in travel to branch plants, customers or conferences within a 500-mile radius of Racine.

Of the firms using Horlick-Racine, S. C. Johnson and Son, Inc., ranks as an executive aircraft pioneer. This company started flying across international borders as early as 1936—on a South American trip. The purpose was to investigate carnuba wax—a material used in their manufacturing process.

Besides several flights a year to the Canadian plant in Brantford, Ontario, the company officials engaged in good will flights to South America again in 1956 and 1958.

In addition to hundreds of business trips, the wax manufacturer two years ago launched "Operation Welcome." Customers and friends of the company are flown to Racine to visit the modern corporate offices designed by the late Frank Lloyd Wright.

Another key use of aircraft by Johnson's Wax is advertising and sales promotion. When the company introduced its new insect killer, the twin engine Aero-Commander was painted to resemble a bug. The plane flew through the southern United States promoting the product.

J. I. Case Co. is possibly the largest industrial user of aircraft in Racine. Case flight operations provide transportation for executives and key personnel to all major cities in the United States and Canada east of the Rocky Mountains.

Annually Case planes fly in excess of 200,000 airplane miles on day, night and instrument flight operation. Case pilots also make "critical cargo flights," transporting badly needed supplies, parts, or equipment to branch plants.

Aviation annually saves Twin Disc Clutch Co. thousands of executive hours. In business one must translate time into money, explains company president, John H. Batten, a longtime air enthusiast.

"By using corporate flying the firm can realize more contacts per month for specialized purchasing, manufacturing, engineering, and sales executives," contends Batten, one of the organizers and now chairman of the board for Racine Commercial Aviation Corp.

This sums up Batten's feeling about executive aircraft, a feeling that first stirred in him in 1938 when he and Carlyle Godske, an awning manufacturer and present owner of Godske Co., became interested in establishing an airport close to Racine. Godske already operated one of two fields in nearby Sturtevant, an agricultural community five miles to the east.

"The Sturtevant sites were too far away for the convenience of Racine flyers. Besides, expanding either one would have required using valuable agricultural land. The site, recommended by the then CAA, was largely scrub land and marginal farm acreage, but the location was convenient to Racine, and it had good soil and air drainage," Batten recalls.

Roughly one half the original 267-acre site was owned by the Horlick estate. The Horlicks invented and marketed malted milk, and maintain a Racine plant today. The balance of the property was purchased by the Batten Realty Corp. organized to purchase the land.

In the early 1940s the land was first offered to the city for development as a public airport. When the offer was rejected, the owners constructed the airport without city aid.

"We originally felt airport management should be a public undertaking," says Batten.

Three stone-surfaced, 2,000-foot runways, the present main hangar, and T-hangars were erected, and Godske became manager of the field. In 1949 Wisconsin Central Airlines commenced service into Racine and recommended runway improvements. City officials again turned down the purchase and improvement of the property, and in December, 1950, the Racine Commercial Airport Corp. was born. That was shortly after Wisconsin Central had halted flights into the community.

The industrialists, however, realized the value to their business operations of a modern, well-equipped airport. Racine, they agreed, must be kept on the air map. All knew that present-day competition in business make good air travel facilities as mandatory as good roads were a generation or more ago. Thriving Horlick-Racine is a monument to their perception.

IN THE intervening years, the thinking of the airport's organizers had undergone a change, too. Batten now believes the community does not need a tax-supported flying field.

"City officials and the present owners agree it is unnecessary for taxpayers to be burdened with a flying field used almost exclusively by industry," he says.

Racine residents, Batten points out, are adequately served by commercial flying services at Milwaukee's Mitchell field, less than 20 miles away.

"Horlick-Racine does perform a public service, though, by offering a landing field

without fee for out-of-town businessmen," he says.

Howard Tauber of Chicago, general manager of the Racine Aqua-Land Co., who flies in three times a week to inspect the SCUBA diving equipment firm, is typical of Horlick-Racine transients.

"I'm almost a commuter," says Tauber. Even Linda, his 11-year-old daughter, who is frequently a passenger with her dad, is well known at the field.

This family feeling extends further into the airport's operation than one might expect.

"J. I. Case and Messey-Harris, both farm implement manufacturers, are the fiercest competitors in business," says airport manager Sullivan. "But I've seen times when they'll loan out their pilots to one another in a pinch, and believe it or not, they have even offered the use of their planes when the other company's were down for repairs."

That may explain why business, from all angles, is really flying at Racine. END

The Weejet

(Continued from page 57)

cient provision for all payload, pilot, passenger, fuel and baggage to be located very close to the empty weight center of gravity, resulting in a minimum center of gravity shift with varying payload and in minimum trim problem.

A 24-volt electrical system is used. Landing and wing tip navigation lights are located in the nose of the wing tip tanks. Provision is made for complete flight instruments and radio equipment.

The control system is a dual side-by-side stick type. Elevators are controlled by a ball bearing mounted push-pull rod system. Dual hang-type rudder pedals, each with brake pedal, operate the rudders on the V-tail by a cable system. Large flaps are electrically operated with an infinite position control. Electric flap position indication is provided.

Elevator trim tabs are electrically actuated with control located on the sticks. A single quadrant push-pull throttle is mounted on the cockpit center line at the base of the instrument panel and forms a control pedestal between the seats.

Even with all the above mentioned features and extras, this aircraft has spectacular performance, considering its powerplant, weight and payload. First look at the weights: empty weight is 1,550 pounds; useful load, 1,250 pounds; gross weight, 2,811 pounds; maximum gross weight with full tip tanks, 3,520 pounds.

The Weejet takes off at sea level in 816 feet and lands in 1,292 feet, to a full stop. The Continental engine will take the Weejet to a service ceiling of 44,000 feet, with a rate of climb of 2,500 fpm at sea level and 1,250 fpm at 25,000 feet. Speed varies from a slow stall speed of 57 mph to maximum sea level flight of 310 mph. This airspeed increases with altitude to a maximum of 328 mph at 15,000 feet and to 346 mph at 25,000 feet. Design cruise speed is 280 mph. Design dive speed is 366 mph at sea level or .65 Mach above 14,200 feet.

The maximum range, with tip tanks in-

(Continued on page 100)

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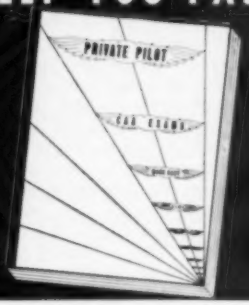

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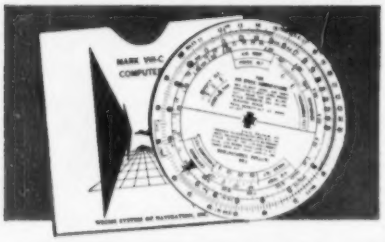

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(Continued from page 99)

stalled, provides enviable non-stop performance to pilots who are tired of short hops with consequent delays: 893 statute miles at 15,000 feet; 1,436 miles at 25,000 feet and 2,060 miles at 35,000 feet. This means New York to Los Angeles with only one refueling stop and plenty of fuel to spare at the end of each hop.

Harold Dale made sure his Weejet met the requirements of the CAR, Part 3 and of CAM 3 in order to obtain a type certificate. The Weejet is designed to meet a maneuvering load factor of plus six and minus three at a gross weight of 2,800 pounds and plus 4.6 and minus 2.0 at gross weight of 3,520 pounds.

Dale is current in many types of aircraft and regularly flies his own plane on business trips. Harold made the first six test flights of the Weejet himself to prove his faith in its design, and to get the feel of the new airplane firsthand. Dale said the Weejet handled with no more difficulty than other similar size piston engine planes like Bonanzas and Navions.

For maximum "red-line" performance one had to watch both the airspeed indicator and the Machmeter because under different flight conditions one would reach the red line before the other. Harold was pleased beyond expectations with the smooth handling of the Weejet and found that no really new techniques were necessary to adapt to the jet engine. Even the jet engine "throttle delay" was nowhere near as long as he expected.

On several occasions the Weejet inadvertently has been referred to as an amateur-designed and built aircraft. Nothing could be farther from the truth. Harold Dale is a well-known west coast aeronautical engineer and businessman. He was project engineer on the B-45 bomber, has been project manager on the F-108 military jet fighter and is now assistant to the chief engineer at North American Aviation's Los Angeles Division. It is true that he has successfully designed and built many so-called amateur aircraft since the 1930s and has acted as consultant to other amateurs and aircraft companies.

For this project, Harold Dale teamed up with an old friend, Edward Gagnier, who actually fabricated two Weejets to Harold's design and specifications in his Carma Aircraft Co. shops at Tucson, Ariz. One was for flight test and the other for static test.

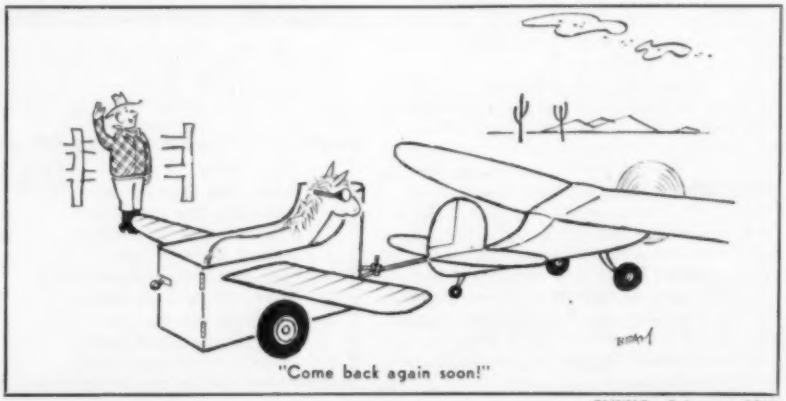
Ed Gagnier was an associate of Dale's on the B-45 project. In 1948, however, Gagnier started his own company and has since expanded to branches in the Los Angeles and Tucson, Ariz. areas.

The first Weejet was well along in its flight test program in the spring of 1956 when an unfortunate event occurred. The aircraft successfully had passed all preliminary flight tests, including spins when, during a five-turn spin recovery maneuver, it went into a high-speed negative "G" condition. The pilot bailed out as the Weejet continued into an outside loop entry. The aircraft ended up flying in inverted flight and continued in this attitude until demolished on ground impact some miles away.

Examination of the wreckage and onboard oscillograph records showed that the elevator trim tab control (on the stick) had been inadvertently placed in the full nose-down position without the pilot realizing it. The result was a partial hard outside loop which opened the canopy and forced the pilot to parachute from the aircraft. The loss of the Weejet was a blow to Dale and Gagnier. However, the aircraft was proven satisfactory in all respects.

A discussion of costs to build the Weejet immediately hits a stumbling block on the jet engine high initial costs. When originally built in 1955-56, Dale figured the airframe could be built for about $35,000, including extras such as oxygen system, etc. Today it appears this would be more in the vicinity of $50,000 and require enough production, to break even, on the order of 200 airplanes. Presently an engine similar to the one in the Weejet, the French-built Turbomeca, is understood to sell for about $15,000 in France, while a U. S.-built counterpart could be expected to cost about twice that amount. The jet engine situation may not be too bad, however, for it appears that J-69s should be available as government surplus since there is a program to replace the present Cessna T-37 engine—the same one used in the Weejet design—with higher thrust engines.

Harold Dale has no immediate plans to build more Weejets. He is too busy with other work to tackle the job now. It appears that the nation's pilots are the losers as a result. The design and tooling are still in existence. To this writer it certainly seems that the Weejet would be the best bet available to get the ball rolling on a small, well designed, high-performance, jet at a price acceptable today. END



"Come back again soon!"

New Approach

(Continued from page 53)

emphasis on the turn-and-bank and attitude gyro.

When the student finishes this section, he is well indoctrinated for his first actual hour of instruction. Not only that, but the flight instructor has been saved several hours of the usual "patter" that is necessary with every new student before and after the first few flights.

Section three covers meteorology. In effect, this part of the course is directed from the Weather Bureau as the student is introduced to the actual facilities via color slides.

Not only does he see all the instruments which give him weather information, but the sound effects of teletypes and other Weather Bureau sounds are incorporated right in the sound tract. He sees color slides of all types of clouds, frontal systems and other weather that he might someday encounter. Radio weather broadcasts are recorded so he'll know what to expect before he actually starts listening for them.

Section four is a complete course in the use and operation of computers. Navigation is dealt with in section five. An example of its thoroughness is in an imaginary trip. Color slides show the course drawn and marked on the chart. During the trip, a checkpoint is shown on the map and then an aerial photograph of the checkpoint is projected. At this point a huge thunderstorm is shown. A pilotage problem is brought up. On the chart a railroad is shown that can be followed to a river and the river to an alternate destination. Aerial photographs of the railroad and the river follow. Here again the student literally makes the flight, learns how to meet situations, experiences how all the elements will look before encountering the actual conditions in an aircraft.

RADIO navigation makes up section six. Here again, the student hears radio signals of all types as he sees charts and radio navigation facilities. He also listens to all radio procedures, from calling the tower for taxi instructions to calling for weather information in flight.

FAA regulations are covered in the final section. As before, regulations are narrated while pictorial situations are shown on the screen.

Included in the course is a student workbook on each section. The copy expands on what he hears narrated, and pertinent slides are reproduced in the booklet. These workbooks alone make a valuable reference library for any pilot. Finally, practice tests on each section are included. Once you have seen the course, you can understand why 85 to 95 per cent of the students pass their written exams with flying colors.

In all, the course incorporates 1,200 colored slides and 15 hours of narration. While this may seem large, it offers a number of advantages to the student and to the operator. For example, many a businessman refuses to tie himself down to a two night a week course that may last for six weeks or longer. With the Sanderson method he can take each section as he desires or as business permits. Strange as it may seem, many successful businessmen hesitate to expose themselves to competitive learning with younger men who have just come out of school and are somewhat "more in practice."

In this case, they can take the entire course alone.

For the operator it means that a good ground school course has been standardized —that every student will get exactly what he needs and is paying for because nothing can be accidentally overlooked. To the small operator, it means that one or more students can be studying while he is out giving flight instruction. And in many cases it has proved to be just what is needed as the final sales tool that has pushed a reluctant prospect into learning to fly and buying an airplane.

While there's nothing startlingly new about this visual-audio course, its thorough preparation and fine organization certainly makes its $495 cost a good and practical investment.

This is borne out by Cessna Aircraft Company, which thinks so highly of its possibilities that it has in effect underwritten Sanderson by ordering a number of the courses, which they are in turn promoting to their distributors and dealers. Piper Aircraft Corporation is also working on a similar deal. Sanderson Films, Inc. are located at P. O. Box 2544, Hillside Station, Wichita, Kan. END

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February 19—"Air Show—U.S.A."—a 90-minute TV spectacular, featuring National Air Shows stars, Harold Krier, three-time precision aerobatics champion, and Bill Sweat. C.B.S. network, 2:30 p.m. to 4 p.m., E.S.T.

March 5-9—Sixth Annual Gas Turbine Conference and Products Show, sponsored by The American Society of Mechanical Engineers and the U. S. Department of Defense. Shoreham Hotel, Washington, D. C.

March 10-12—Third Annual Missile and Space Conference, Cobo Hall, Detroit, Mich. Sponsor: Michigan Aeronautics and Space Administration.

March 17-19—Lawyer-Pilots Assn. Board Meeting and Fly-in, Phoenix, Ariz.

March 19—New York State Flying Farmers' Assn., Elmira Dinner, at Chemung County Airport.

April 4-5—First Aviation Technician School Administrators Conference, Purdue University, LaFayette, Ind.

April 14—New York State Flying Farmers' Assn., tour of Piper Aircraft plant, Lock Haven, Pa.

April 22-25—Thirty-fourth Annual Conference, American Assn. of Airport Executives, Broadmoor Hotel, Colorado Springs, Colo.

May 20-21—Fourth Annual West Coast Antique Airplane Fly-in, Merced, Calif. Saturday night dinner and dance, plus trophies and awards on Sunday. Contact: Antique Fly-In Committee, 127 West 21st St., Merced.

May 27-28—State Convention, Flying Farmers' Assn., Norwich, N. Y.

June 13-15—Thirty-seventh Meeting, Aviation Distributors and Manufacturers Assn., Dennis Hotel, Atlantic City, N. J.

Calendar items must be received by FLYING's editorial office, 1 Park Avenue, New York 16, N. Y., two months prior to the event.

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44, 45—JOHN FLANNERY

48, 49—LOU DAVIS

53—AZIM STUDIOS

54, 55—HANS GROENHOFF, OFFICIAL PHOTO, U. S. NAVY

56—HAROLD DALE

58, 59—WALTER GERHARDT

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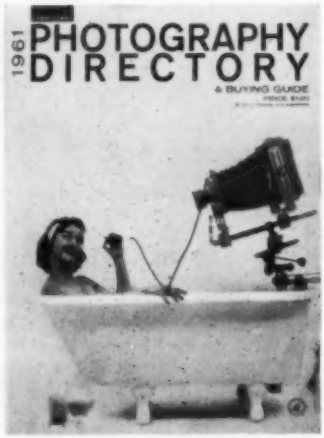

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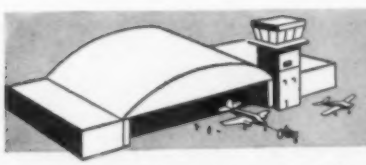

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Flying—February 1961
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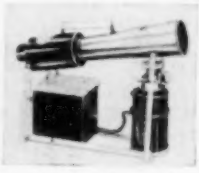
revised plan provides for continuing both VRF and IFR (below 24,000 feet) communication service on the 100 kc channels between 118-127 mc until Jan. 1, 1966. Full details are published in FAA Bulletin No. 152, available from the agency's Office of Public Affairs, Washington, D. C.

Zon Automatic Scarecrow, an acetylene gas-operated combustion "cannon" developed in the Netherlands and used successfully to frighten birds and other wildlife off the airport runways, and keep them off, is now available in this country through B. M. Lawrence & Co., importers, of 244 California St., San Francisco. Gas fed into combustion chamber behind horn-shaped barrel drives a piston which cocks the firing mechanism to make a small but loud explosion. A valve regulates flow of gas and its adjustment determines the firing interval of the "Scarecrow."



Simple method of learning low frequency radio navigation and orientation procedures is offered through a new high-fidelity long-playing record called "L/F Radio Range Orientations." Produced by Flight Line Specialties Co., P. O. Box 937, Tulare Airport, Calif., this unconditionally guaranteed album costs $7.50 with illustrated instruction booklet.

Bay Aviation Services, recently Oakland Airmotive Co., has consolidated its Oakland and San Francisco branch facilities and moved the entire operation into an enlarged hangar at San Francisco International Airport.

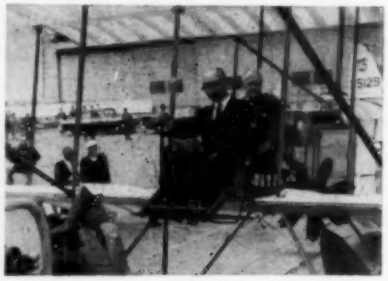
McCollum Airport was dedicated last September by County Road Commissioner Herbert C. McCollum, (left), for whom it was named, U. S. Senator Herman Talmadge and Mrs. Jeannette Young, Miss

Georgia of '58, Miss Dixie of '59, who also made her first solo flight on opening day. Located five miles NW of Marietta, Ga., the airport cost $400,000, offers a 4,000-foot runway.

Tennessee Aeronautics Commission has published a new state airport directory. Available without charge upon request to the Commission at Berry Field, Nashville, the loose-leaf directory contains illustrated airport listings with pertinent data for each airport. It also includes introductory pages on navigation aids, FAA Flight Service Stations, Weather Bureaus and state broadcast stations. Alabama and Nebraska also have available new state aeronautical charts, and the Idaho Dept. of Aeronautics has revised its fine airport directory and state aero chart, free on request.

Maj. Alexander R. Lawson (Ret.), of Thorofare, N. J., has made a comprehensive study of "Uniforms of American History" and has prepared some 400 color slides which have been shown widely throughout the country. The selection includes the Air Force Academy uniforms, the latest to enter the picture. His work has been praised by the Congress, and these slides are available to accredited aviation organizations planning an evening of entertainment or education at no charge, we are informed, other than postage or express cost.

The first man to fly in Japan, Lt. Gen. Yoshitoshi Tokugawa, 77, sits at the controls of the same airplane he first flew over Tokyo 50 years before—in 1910. Gen. Tokugawa's back seat copilot is Maj. Gen. Benjamin Foulois (Ret.), who soloed U.S. Army Airplane No. I in 1910. Witnessing



the event at Johnson AFB, Japan, were Gen. Minoru Genda, chief of staff, Japan Air Self Defense Force, Lt. Gen. Robert W. Burns (lower left); Fifth AF Commander, and members of the Tuesday Musical Club.

King Radio Corp. has moved into new and expanded quarters at 139 S. Brockway, Olathe, Kan. pending construction of a large new plant to be built this year on a 12-acre site in this rapidly developing industrial center 15 miles from Kansas City. The company was previously located at Merriam, Kan., a few miles to the north.

In a warning to private pilots to check cabin heaters, the FAA calls attention to the fact that colorless, tasteless, non-irritating carbon monoxide gases from an airplane's heater can make a pilot unconscious or have his judgment or ability severely affected. "Only six parts of carbon monoxide in 10,000 parts of air," notes FAA, "can produce unconsciousness in two hours." Even lesser concentrations would affect a pilot's ability to fly safely, it concludes.

Frank Coffyn, oldest pilot in the nation and last of the original five members of the Wright Brothers exhibition flying team, died recently at his home in Palo Alto, Calif. at the age of 82. Mr. Coffyn was taught to fly by Orville Wright at Dayton, O., in 1910. He held pilot's license No. 26.

Los Angeles' first private heliport, atop the new 16-story Signal Oil and Gas Co. building at Wilshire and Beaudry, received its first passengers recently when a Bell J47-2, flight marked dedication of the facility. The helistop will afford quick transporta-

tion for Signal's personnel to and from airports and company operations throughout southern California, according to Russell H. Green, president. It will also be available in emergencies to Civil Defense agencies, as well as the city's police, fire and sheriff's departments.

Color vision requirements for airmen applicants—commercial, student and private medical certificates—have been liberalized by FAA, and aviation medical examiners advised of the liberalized standards. The action, which eliminates the "practical signal light test" and permits a lower passing score, will result in unlimited certification of some applicants who previously could not meet the requirements.

As an independent source of electric power, the Onan 2500-watt portable electric generating plant product of the Studebaker-Packard Corp., Minneapolis, is proving an important flight line accessory for Minnesota Airmotive Inc., local aircraft servicing firm. Equipped with newly-developed "Idle-Matic" control and radio

shielding Model 1205AJ-1PL demonstrates its usefulness (above) in a ramp check of a marker beacon receiver in an Aero Commander Alti-Cruiser. Vacuum cleaners, electric buffers and similar power tools can be used with the generator.

Sky Guide, a pocket-size encyclopedia of flying facts for the pilot is now available in a recently revised second edition. A 220-page booklet, compiled, edited and published by Monty Navarre, 2091 San Vincent Ave., Long Beach 15, Calif., the price is $1.95 from publisher or airports.

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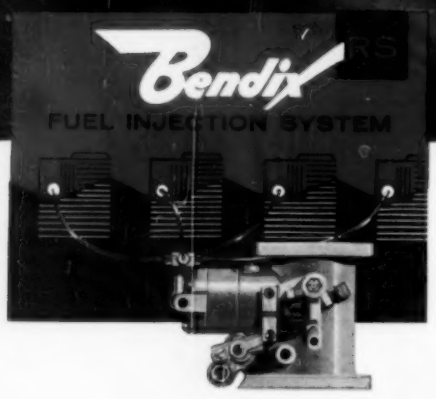

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